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FINAL ORDER

OF THE BOARD OF NATURAL RESOURCES AND CONSERVATION

ESTABLISHING WATER RESERVATIONS ABOVE FORT PECK DAM

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BEFORE THE MONTANA BOARD OF NATURAL
RESOURCES AND CONSERVATION

* *

IN THE MATTER OF WATER RESERVATION APPLICATION NOS. 70115-41F 71895-41I 72578-41L) 70117-41H 71966-41S 72579-41T) 70118-41H 71997-41J 72580-41A) 70119-41H 71998-41S 72581-41I) 70270-41B 72153-41P 72582-41I) 71537-41P 72154-41K 72583-41P) 71688-41L 72155-41A 72584-41S) 71889-41Q 72256-41P 72585-41M) 71890-41K 72307-41Q 72586-41P) 71891-41P 72574-41O 72587-41G) 71892-41G 72575-41K 72588-40C) 71893-41K 72576-40E 73198-41I) 71893-41I 72577-41P 73199-41S) IN THE UPPER MISSOURI RIVER BASIN	FINDINGS OF FACT, CONCLUSIONS OF LAW, ORDER, AND MEMORANDUM

* *

MISSOURI RIVER BASIN WATER RESERVATIONS
INDEX

INTRODUCTION 1

FINDINGS OF FACT

Municipalities
City of Belgrade
70119-41H 4
City of Bozeman
70118-41H 10
City of Chester
72583-41P 18
City of Conrad
71537-41P 24
City of Cut Bank
72578-41L 29
City of Dillon
70270-41B 35
City of East Helena
71895-41I 36
City of Fairfield
72154-41K 42
City of Fort Benton
71889-41Q 47
City of Great Falls
71890-41K 53
City of Helena
72581-41I 59
City of Lewistown
72584-41S 65
Power-Teton Water and Sewer District
72575-41K 71
City of Shelby
71891-41P 72
City of Three Forks
70117-41H 78
Town of West Yellowstone
70115-41F 84
City of Winifred
71998-41S 90

State of Montana Department of Health and Environmental Sciences
72582-41I 96

State of Montana Department of Fish, Wildlife, and Parks
72155-41A 115

U.S. Bureau of Land Management
72580-41A 186

Conservation Districts

Big Sandy Conservation District
72256-41P 201
Broadwater Conservation District
71894-41I 208
Cascade Conservation District
71893-41K 217
Chouteau County Conservation District
72307-41Q 227
Fergus County Conservation District
73199-41S 236
Gallatin County Conservation District
72587-41G 245
Glacier County Conservation District
71688-41L 254
Hill County Conservation District
72577-41P 262
Jefferson Valley Conservation District
71892-41G 268
Judith Basin Conservation District
71966-41S 277
Lewis & Clark County Conservation District
73198-41I 286
Liberty County Conservation District
72153-41P 294
Lower Musselshell Conservation District
72588-40C 302
Meagher County Conservation District
71997-41J 311
Pondera County Conservation District
72585-41M 317
Teton County Conservation District
72574-41O 325
Toole County Conservation District
72586-41P 334
Valley County Conservation District
72576-40E 342

U.S. Bureau of Reclamation
72579-41T 350

CONDITIONS FOR ALL APPLICATIONS - Exhibit A 360

CONDITIONS FOR CONSUMPTIVE USE APPLICATIONS - Exhibit B . . . 361

CONDITIONS FOR INSTREAM FLOW APPLICATIONS - Exhibit C 362

MEMORANDUM 365

ORDER OF ADOPTION 398

I. INTRODUCTION

This matter came regularly for hearing, beginning February 3, 1992, and continuing through February 28, 1992. The hearing was conducted by Peter T. Stanley, duly appointed as Hearing Examiner by the Board of Natural Resources and Conservation (Board). The following parties appeared by and through the counsel indicated:

J. B. Anderson, Jr.	Various Objectors (Upper Big Hole)
John Bloomquist	Whitetail Water Users and Various Objectors
Monte J. Boettger	City of Lewistown
Calvin Braaksma	City of Three Forks
Hugh Brown	Liberty County and Hill County Conservation Districts
Steve Brown and Stan Bradshaw	Trout Unlimited and American Fisheries Society
John Chaffin	U.S. Department of Interior, Bureau of Reclamation and Bureau of Land Management
Carl M. Davis	Various Objectors (Ruby, Beaverhead and Grasshopper Creek)
Ted Doney	Teton Water Users Assoc. and Various Objectors
Holly Franz and Susan Callaghan	Montana Power Company
W. G. Gilbert, III	Various Objectors (Lower Big Hole
David Gliko	City of Great Falls
Mark Guenther	Lower Jefferson Canal
Max Hansen	Various Objectors
James Hubble	William E. Reichelt

Mona Jamison and Bob Thompson	Montana Department of Health and Environmental Sciences
Robert Lane and Curtis Larsen	Department of Fish, Wildlife and Parks
Peter S. Lineberger	Town of West Yellowstone
Donald Marble	Town of Chester
Dale Reagor	City of East Helena
William A. Schreiber	City of Belgrade
Dale Schwanke	Pondera County Canal and Reservoir Company
Paul Smith	Various Objectors (Boulder)
Gary Spaeth	Various Conservation Districts Applicants and Montana Association of Conservation Districts
Keith Strong	Greenfields Irrigation District
Loren Tucker	Various Objectors (Mill Creekand Wisconsin Creek)
Cindy Younkin, Perry Moore, and Russ McElyea	Upper Musselshell Users Association, City of Bozeman and Various Objectors
Also appearing was:	
Mike Franich	Fish Creek Ditch Co.

In addition to the formal hearing held in Helena, the Hearing Examiner held informal hearings in Lewistown, Great Falls, Bozeman, Dillon and Glasgow. Persons who gave testimony, under oath, at the public hearing are considered parties for a limited purpose in this proceeding.

The Hearing Examiner accepted into the record prefiled, written testimony of the parties, sworn testimony presented at the hearing and certain documentary evidence. The Hearing Examiner submitted a Proposal for Decision to the Board on May 15, 1992. On June 16 and 17, 1992, the Board heard oral argument on Exceptions to the Proposal for Decision. The Board, having fully considered

such evidence and the arguments of the parties, makes the following Findings of Fact, Conclusions of Law, and Order. Any party's proposed Findings of Fact, Conclusions of Law or Orders, or Exceptions not specifically adopted herein are rejected by the Board as not being supported by the evidence or the law.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF BELGRADE TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Belgrade is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh.3-A, p. 2; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Belgrade has applied for a water reservation of 645 acre-feet/year (af/yr) of water with a maximum diversion rate of 3.56 cubic feet/second (cfs), from groundwater wells drawing from the Gallatin Valley aquifer to be located within the City of Belgrade for year round use. (Bd. Exh. 3-A, pp. 2, 14, and 25.)

3. The City of Belgrade requested a water reservation to meet future demands by municipal users. (Bd. Exh. 3-A, p. 5.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF BELGRADE (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Belgrade seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 3-A, p. 2.)

5. The purpose of the reservation is to provide the water for municipal uses. (Bd. Exh. 3-A, p. 3.) Municipal uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF BELGRADE (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The City of Belgrade's three existing groundwater wells presently provide up to 7.58 cfs of water to the City of Belgrade. (Bd. Exh. 3-C, p. 2.) The reservation water requested would be delivered through the existing water supply system. (Bd. Exh. 3-A, p. 4.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal growth. In the future, water may be appropriated by

competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 3-A, p. 6-7.)

8. It is important that the City of Belgrade have a water reservation to meet future municipal water demands in order for the community to grow and invest in its development. (Bd. Exh. 3-A, p. 21.)

9. Competing water uses may prevent the City of Belgrade from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Belgrade may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249, and Bd. Exh. 3-A, p. 22.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF BELGRADE (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Belgrade was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 3-C, p. 2.) The methodology used by the City of Belgrade projected an average annualized (compounded population growth rate) of approximately 3.32 percent. (Bd. Exh. 40, p. 236.) The 1990 population of City of Belgrade was 3,411. (Bd. Exh. 40, p. 236.) The City of Belgrade's population forecast for the year 2025 is 10,426 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that Belgrade's population has increased from 2,336 to 3,411 persons between 1980 and 1990 (an annualized rate of 3.86 percent). (Bd. Exh. 3-A, p. 10, and Bd. Exh. 40, p. 236.)

12. The City of Belgrade has a noticeable rate of system leakage. (Bd. Exh. 3-C, p. 2.) However, leakage rates are expected to be reduced by a city metering program and planned water system improvements. (Bd. Exh. 3-C, p. 2.) These programs will reduce the City's high daily use rates toward the regional average of 250 gallons per capita daily. (Bd. Exh. 3-C, p. 2.)

13. Approximately 80 percent of City water services are metered at present. (Bd. Exh. 3-C, p. 3.) The City is working to achieve 100 percent metering. (Bd. Exh. 3-C, p. 3.)

14. The water use efficiencies associated with the reservation for municipal uses by the City of Belgrade are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measures in addition to those listed above, could be taken within the reservation term to

increase the use efficiency by the City of Belgrade and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

16. The City of Belgrade's present use (3.82 cfs peak flow and 1,155 af/yr volume) is less than its projected need in the year 2025 (11.1 cfs peak flow and 3,357 af/yr volume). (Bd. Exh. 3-C, p. 2.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF BELGRADE IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

17. Benefits of the City of Belgrade's water reservation were calculated on a willingness-to-pay basis. Belgrade used a $1.50/1,000 gallons value. (Bd. Exh. 3-A, p. 18.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

18. The additional water provided by the water reservation will cost approximately $.18/1,000 gallons. (Bd. Exh. 3-C, p. 1.)

19. The direct benefits of the City of Belgrade's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

20. Indirect benefits of the City of Belgrade's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 3-A, p. 20.)

21. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 3-A, p. 20.)

22. Except for the addition of nutrients and possible decreases in groundwater flows to the East Gallatin river, no moderate or major adverse environmental impacts are expected with the use of the City of Belgrade's water reservation. (Bd. Exh. 3-C, pp. 5 and 6.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Any resulting health risks have not been quantified. Other non-quantified benefits or costs are limited. (Bd. Exh. 3-A, p. 20.)

23. Net benefits of granting the City of Belgrade's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

24. The City of Belgrade identified one alternative source of water for future development, an unspecified surface water

source. This alternative would not provide greater net benefits than the water reservation, (Bd. Exh. 3-C, p. 3) and is not reasonable. (ARM 36.16.107B(4)(c).)

25. Failure to reserve water for future municipal use by the City of Belgrade is likely to result in an irretrievable loss of the source of water. (Bd. Exh. 3-A, p. 22; ARM 36.16.107B(4)(d).)

26. As conditioned, the City of Belgrade's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

27. The water reservation by the City of Belgrade will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 3-A; ARM 36.16.107B(5) and (6).)

28. The City of Belgrade has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 3-A, p. 23.)

29. The City of Belgrade is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

30. The priority date of the City of Belgrade's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

31. As conditioned, the City of Belgrade's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

32. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Belgrade is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Belgrade's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Belgrade has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Belgrade are suitable and accurate under present conditions. (ARM 36.16.107(3)(a).) As modified, the City of Belgrade has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Belgrade as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Belgrade is granted for the following amount and flow of water: 3.56 cfs and 645 af/year.

2. The point of diversion and places of use are as set forth in the reservation application City of Belgrade and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation

granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF BOZEMAN TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Bozeman is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 4-A, p. 2; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Bozeman has applied for a water reservation of 6,000 acre-feet/year (af/yr) of water with a maximum diversion rate of 327 cubic feet/second (cfs) to be stored in an on-stream reservoir on Sourdough Creek (also known as Bozeman Creek) for year round use. (Bd. Exh. 4-A, pp. 2 and 3.)

3. The City of Bozeman requested a water reservation to meet future demands by municipal users. (Bd. Exh. 4-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF BOZEMAN (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Bozeman seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 4-A, p. 2.)

5. The purpose of the reservation is to provide the water for municipal uses. (Bd. Exh. 4-A, p. 2.) Municipal uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF BOZEMAN (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2.)

6. Lyman Creek, Sourdough Creek, Hyalite Reservoir, and Hyalite Creek presently provide reliable water supplies averaging 12.97 cfs (9,399 a.f). to the City of Bozeman at its point of diversion. (Bd. Exh. 4-C, p. 4.) In 1990, the City of Bozeman averaged 7.67 cfs of municipal consumption (5,555 af). (Board Exhibit - Bozeman Exhibit No. 5, p. 1.) The reservation water request would be delivered from a proposed new reservoir on Sourdough Creek and conveyed to the existing Sourdough Creek diversion dam by flowing down approximately 2.5 miles of natural stream channel. (Bd. Exh. 4-C, p. 3.)

7. A reservation is the only means to obtain an early priority date for water that may be needed to meet projected municipal growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 4-A, p. 6.)

8. If alternative water supplies are not adequate, it is important that the City of Bozeman have a water reservation to meet future municipal water demands in order for the community to prosper and develop. (Bd. Exh. 4-A, p. 24.)

9. Competing water uses may prevent the City of Bozeman from obtaining or perfecting an existing claim or a future water use permit. Without alternative supplies or a reservation, the City of Bozeman may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

10. If alternative water supplies are not adequate, a water reservation for the City of Bozeman may be needed. (Mont. Code Ann. § 85-2-316(4)(a)(ii); ARM 36.16.107B(2).)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF BOZEMAN (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

11. The method of determining the amount of water requested for a water reservation by the City of Bozeman was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 236.) The methodology used by the City of Bozeman projected an average annualized (compounded annual population growth rate) of approximately 1.20 percent. (Bd. Exh. 40, p. 236.) The City of Bozeman submitted an amended application projecting an average annualized growth rate of 1.90 percent. (Bozeman Exh. 2, p. 6.) The 1990 population of Bozeman was 22,660. (Bd. Exh. 40, p. 236.) The City of Bozeman's application forecasts a population in the year 2025 of 37,000 people. (Bd. Exh. 40, p. 236.) The amended application population forecast was 43,788 people. (Bozeman Exh. 2, p.6.)

12. Recent populations recorded in the 1990 census indicate that from 1970 to 1990, Bozeman's population grew from 18,670 to 22,660 people at an annual growth rate of less than 1 percent per year (a .97 percent annualized growth rate) (Bd. Exh. 4-C, p. 8.) The city's population grew from 18,670 people in 1970 to 21,645 people in 1980 (an annualized growth rate of 1.49 percent) and from 21,645 to 22,660 people from 1980 to 1990 (annualized rate of .45 percent) (Bd. Exh. 4-C, p. 8.) The 1983 Bozeman Area Master Plan projected long term annual growth rates averaging 1.2 percent, however recent city growth rates have been under 1.0 percent annually (Bd. Exh. 41, pp. 98 and 99.) More recently, in

1991, the Bozeman City-County Planning Office projected the city would grow at a 1.0 percent annual growth rate for the next 10 years. (DFWP Exh. 103.)

13. During 1990, the City of Bozeman diverted an average of 12.06 cfs from its water sources, and pumped an average of 6.93 cfs of treated water from its water treatment plant and .74 cfs of Lyman Creek water into its watermains. (Bozeman Exh. 5, p. 1.) The overall water losses between the city's points of diversion and the release of this water into city watermains averaged 4.39 cfs (36 percent loss rate) during 1990. (Bozeman Exh. 5, p. 1.) Allowing for normal water collection system losses of 10 percent, the total Bozeman municipal water needs in 1990 were approximately 8.44 cfs (6,119 af). The remaining city water diversions could be subject to challenge as wasteful and excessive water usage, and City water claims may be reduced to this lower, more normal level of municipal water system efficiency. No determination of the validity of the claims are made in this order.

14. The large water losses between the city diversion points and the watermains result from constant diversions from Sourdough Creek, Hyalite Creek, and Hyalite Dam, that are not responsive to the city's varying hourly and daily demands. This causes significant overflows from the city's surge ponds (Bd. Exh. 4-C, p. 6.) The city plans to construct a large surge pond (61 acre-feet capacity) within the next 5 to 10 years to limit losses caused by these overflows (Bd. Exh. 4-C, p. 9.) The capacity of city surge ponds is expected to increase a further 61 acre-feet when future city needs require (Bozeman Exh. 11, Att. B, p. 2.) The 1990 Bozeman Area Master Plan Update estimates leakage rates of approximately 10 to 15 percent from the city watermains (Phillip Forbes Dir., Tr. Day 1, p. 108, lines 23-25 and p. 109, lines 1-8.) The City of Bozeman presently delivers into its watermains an average of 219 gallons per person per day (Bozeman Exh. 5, p. 1), from average city diversions of 344 gallons per person per day. (Bozeman Exh. 5, p. 1.)

15. A typical Missouri basin city water system has total use rates of 250 gallons per person daily. (Bd. Exh. 4-C, p. 5.) Bozeman's existing and projected per capita use rates are elevated by 4 percent, because of inclusion of Montana State University usage. (Bozeman Exh. 4; Bd. Exh. 4-C, p. 5.) The City of Bozeman's Director of Public Works testified that total future City needs will average 250 gallons per person per day. (Bozeman Exh. 3, p. 3.) The projected total water needs for the City of Bozeman are projected to be 250 gallons per person per day.

16. Approximately 98 percent of the City of Bozeman water services are metered at present. (Bd. Exh. 4-C, p. 7.) The City expects to be 100 percent metered in the near future. (Bd. Exh. 4-C, p. 7.)

17. A water use efficiency of 250 gallons per person per day for municipal uses by the City of Bozeman is reasonable. (ARM 36.16.107B(3)(b).)

18. The City of Bozeman is a beneficiary of the expansion of the Hyalite Reservoir (also known as the Middle Creek Dam Rehabilitation) that is expected to provide 2,374 af (3.28 cfs) of additional water for the City. (Bd. Exh. 4-C, p. 9.) The additional water from the Hyalite Reservoir expansion, expected to be completed by the fall of 1992, will be entirely allocated to the City of Bozeman, which desires to purchase all of this water. (Bd. Exh. 4-C, p. 9; DFWP Exh. 101, Wysocki cover letter.) The pending Hyalite Reservoir expansion water contract is expected to provide nearly all of the future water needs of the City of Bozeman through the year 2020. (Bd. Exh. 4-C, p. 23; DFWP Exh. 101, p. 125.) Under the yet-to-be-signed contract, the City of Bozeman's share of the suggested minimum pool would be up to 515 af of water, however up to 389 af of spring time flows are normally expected to be available for filling this minimum pool. (Bd. Exh. 4-C, p. 11.) Reliable water yields for the City from the Hyalite Reservoir expansion will be 2,248 af (3.10 cfs). (Bd. Exh. 4-C, p. 11.)

19. Other than the water efficiency improvement measures described above, no other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Bozeman. (ARM 36.16.107B(3)(b).) After the water contract between DNRC and the City of Bozeman is signed, the Hyalite Reservoir expansion will new provide reliable water supplies of 2,248 af (3.10 cfs), which could lessen the amount of water required for the purpose of the reservation by this amount.

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF BOZEMAN IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

20. Benefits of the City of Bozeman's water reservation were calculated on a willingness-to-pay basis. Bozeman used a $1.50/1,000 gallons value. (Bd. Exh. 4-A, p. 22.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

21. The additional water provided by the water reservation was estimated to cost approximately $0.94/1000 gallons. (Bd. Exh. 4-C, p. 13.) However, reducing the size of the proposed reservoir would increase the cost per 1000 gallons, probably to over $1.24/1000 gallons. (Bd. Exh. 4-C, p. 13.) The water costs to the City of Bozeman for the Hyalite Reservoir expansion are estimated at $.10/1000 gallons (DFWP Exh. 101.)

22. The direct benefits of the City of Bozeman's water reservation would exceed the direct costs. (ARM 36.16.107B(4)(a).)

23. Indirect benefits of the City of Bozeman's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base. (Bd. Exh. 4-A, pp. 23 and 24.)

24. Indirect costs of granting the reservation may include loss of future opportunity for other development, and increased administrative costs. While not quantified, these costs are minor. (Bd. Exh. 4-A, p. 23.)

25. There could be significant adverse environmental impact associated with the development of the proposed reservoir. (Bd. Exh. 4-C, p. 1.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Board Exhibit 40, pp. 253-254), but should be very small. Resulting health risks have not been quantified. Additional environmental analyses of this reservation would be required (Bd. Exh. 4-C, p. 23.)

26. Net benefits of granting the City of Bozeman's water reservation exceed the net benefits of not granting the water reservation. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

27. The City of Bozeman identified three alternative sources of water, the Hyalite Reservoir expansion, improved water use efficiencies, and groundwater sources. (Bd. Exh. 4-A, pp. 22 and 23.) The Hyalite Reservoir expansion and improved efficiencies alternatives would be less expensive than the water reservation, (Bd. Exh. 4-A, p. 22) and are reasonable alternatives. (ARM 36.16.107B(4)(c).)

28. Failure to reserve water for future municipal use by the City of Bozeman is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 4-A, p. 25; ARM 36.16.107B(4)(d).)

29. As conditioned, the City of Bozeman's water reservation will not have significant adverse impacts to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

30. The water reservation by the City of Bozeman will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 4-A; ARM 36.16.107B(5) and (6).)

31. The City of Bozeman has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 4-A, p. 26.)

32. The City of Bozeman is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

33. The priority date of the City of Bozeman's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

34. The City of Bozeman's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

35. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Bozeman is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Bozeman's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Bozeman has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Bozeman are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) A more accurate city population projection, for the year 2025, is 32,000 people based on an annualized growth rate of 1.00 percent yearly. As modified, the City of Bozeman has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Bozeman as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative

priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Bozeman is granted for the following amount and flow of water: until the Hyalite reservoir expansion water supply contract between the City of Bozeman and the Department of Natural Resources and conservation is signed, 2,857 af/year of water (flows of 47.3 cfs during spring runoff), if the contract for the Hyalite reservoir expansion water supply (expected to provide the city with a reliable supply of 2,248 af/year) is entered into, the City of Bozeman reservation need will be reduced by the reliable reservoir expansion amount, to an expected need of 609 af/year of water (flows of 10.1 cfs during spring runoff).

2. The point of diversion and places of use are as set forth in the reservation application City of Bozeman and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Specific reservations conditions (for this reservation)

A. Notification of Reservoir Expansion Water Contract Agreement and reliable water yield amount.

B. Environmental Conditions included in Bozeman Final Environmental Assessment.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF CHESTER TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Chester is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh.7-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Chester has applied for a water reservation of 435 acre-feet/year (af/yr) of water with a maximum diversion rate of 1.0 cubic feet/second (cfs) to be diverted from the direct flow water of the Marias River using the city's existing pumping station located 14 miles southwest of Chester on the shoreline of Lake Elwell for year round use. (Bd. Exh. 7-A, pp. 6 and 49.) The City would store up to 92 af of this reservation water in the city's existing 30 million gallon holding reservoir (Bd. Exh. 7-A, p. 7.)

3. The City of Chester requested a water reservation to reserve water in the event the adjudication proceeding reduces the city's amount of water (as held by U.S. Bureau of Reclamation) to that which the city has historically or beneficially used (Bd. Exh. 7-A, p. 4.) The reservation would also provide a water diversion right in the event that the U.S. Bureau of Reclamation contract cannot be renewed. (Bd. Exh. 7-A, p. 4.) The City of Chester provides municipal water.

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF CHESTER (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Chester seeks to provide municipal water for existing uses and for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 7-A, p. 7.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 7-A, p. 4.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CHESTER (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The city water pumping station at Lake Elwell presently provides up to 1.01 cfs of good quality water to the City of Chester. (Bd. Exh. 7-A, p. 21.) The reservation water requested would be delivered through the existing city water pumping station at Lake Elwell. (Bd. Exh. 7-A, p. 7.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet existing uses and projected municipal growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249.)

8. It is important that the City of Chester have a water reservation to meet existing and future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 7-A, p. 32.)

9. The City of Chester could be prevented from obtaining water from Lake Elwell and from using the existing city pumping station following expiration of the city water contract with the U.S. Bureau of Reclamation in the year 2002. (Bd. Exh. 7-A, p. 30; Perkins Dir., Tr. Day 2, p. 9, lines 23-25, and p. 10, lines 1-7.)

10. Before the City of Chester could exercise its reservation, it would have to obtain authorization from the U.S. Bureau of Reclamation (Perkins Dir., Tr. Day 2, p. 10.) Without a reservation, the City of Chester may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

11. Because the U.S. Bureau of Reclamation potentially may not continue the city's water contract, a water reservation for the City of Chester is needed. (§ 85-2-316(4)(a)(ii); ARM 36.16.107B(2).)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CHESTER (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

12. The method of determining the amount of water requested for a water reservation by the City of Chester was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of Chester projected an average annualized (compounded population growth rate) of approximately .86 percent. (Bd. Exh. 40, p. 236.) The 1990 population of the City of Chester was 942. (Bd. Exh. 40, p. 236.) The City of

Chester's population forecast for the year 2025 was 1,418 people. (Bd. Exh. 40, p. 236.)

13. The populations recorded in the 1990 census indicate that over the past 30 years Chester has experienced a long term population decline of -.69 percent per year annualized (from 1,158 people in 1960 to 942 people at present). (Bd. Exh. 7-C, p. 3.) An additional 6 percent of residents who live outside the city limits are provided with city water services. (Bd. Exh. 7-A, pp. 17 and 18.)

14. The City of Chester presently loses a modest 5 percent of its diversions to evaporation and leakage. (Bd. Exh. 7-A, p. 34.) However, Chester average usage of 270 gallons per person daily is greater than the typical basin municipal use rate of 250 gallons per person daily. (Bd. Exh. 7-C, p. 3; Bd. Exh. 9-C, p. 3.) Daily water use rates would be expected to decline to 260 gallons per person following installation of additional water meters (Bd. Exh. 7-C, p. 3.)

15. Approximately 16 percent of the 426 city water service connections are metered at present. (Bd. Exh. 7-C, p. 4.) The City of Chester meters new connections to the water system. (Bd. Exh. 7-C, p. 4.)

16. The water use efficiencies associated with the municipal and industrial uses by the City of Chester are reasonable. (ARM 36.16.107B(3)(b).)

17. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Chester and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF CHESTER IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

18. Benefits of the City of Chester's water reservation were calculated on a willingness-to-pay basis. Chester used a $3.00/1,000 gallons value. (Bd. Exh. 7-A, p. 44.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

19. The additional water provided by the water reservation will cost approximately $1.69/1,000 gallons. (Bd. Exh. 7-A, p. 45.)

20. The direct benefits of the City of Chester's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

21. Indirect benefits of the City of Chester's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 7-A, p. 47.)

22. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 7-A, p. 46.)

23. There is no significant adverse environmental impact associated with the use of the City of Chester's water reservation. (Bd. Exh. 7-A, p. 47.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 7-A.)

24. Net benefits of granting the City of Chester's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

25. The City of Chester identified two alternative sources of water for future development, groundwater wells and water storage on Cottonwood Creek. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 7-A, pp. 45 and 46) and are not reasonable. (ARM 36.16.107B(4)(c).)

26. Failure to reserve water for future municipal and industrial use by the City of Chester is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 7-A, p. 48; ARM 36.16.107B(4)(d).)

27. As conditioned, the City of Chester's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

28. The water reservation by the City of Chester will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 7-A; ARM 36.16.107B(5) and (6).)

29. The City of Chester has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 7-A, p. 49.)

30. The City of Chester is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

31. The priority date of the City of Chester's water reservation is July 1, 1985. (§ 85-2-331(4).)

32. As conditioned, the City of Chester's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

33. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Chester is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Chester's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Chester has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Chester are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) A more accurate population projection for the City of Chester is 1,100 people based on a .40 annualized growth rate. As modified, the City of Chester has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Chester as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Chester is granted for the following amount and flow of water: .93 cfs and 340 af/year.

2. The point of diversion and places of use are as set forth in the reservation application City of Chester and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF CONRAD TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a)).

1. The City of Conrad is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 10-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a)).

2. The City of Conrad has applied for a water reservation of 1,322 acre-feet/year (af/yr) of water with a maximum diversion rate of 5.45 cubic feet/second (cfs) to be diverted from a newly developed city pumping station, located 14 miles northwest of Conrad, that would access a deeper portion of the inactive pool of Lake Frances than the present city pumping station. This new pumping station would be located about 9,000 feet upstream of the existing pumping station on the shoreline of Lake Frances, and would pump water to the existing city pumping station (which diverts water from the Lake Frances outlet works) to provide year round municipal water supplies. (Bd. Exh. 10-A, pp. 1, 3 and 38. and Bd. Exh. 10-C, p. 3).

3. The City of Conrad requested a water reservation to reserve water to supplement and increase the ability of the city to physically pump water from Lake Frances by moving the point of city diversion to a new location that would access the deeper inactive pool of Lake Frances. (Bd. Exh. 10-A, p. 8). Because Lake Frances water and lands are held by the Pondera County Canal and Reservoir Company (PCCRC), the help and cooperation of the PCCRC would be necessary to develop the reservation (Bd. Exh. 10-A, p. 7).

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF CONRAD (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Conrad seeks to provide municipal water for existing uses and for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation would be to year 2025. (Bd. Exh. 10-A, p. 7).

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 10-A, p. 4). Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b)).

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CONRAD (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The present city water pumping station at Lake Frances provides up to 5.50 cfs and 3,270 af of water to the City of Conrad. (Bd. Exh. 10-A, pp. 42 and 4). The reservation water request would be delivered through a new submerged pumping station located nearer the deeper inactive pool area of Lake Frances. (Bd. Exh. 10-A, p. 38).

7. A reservation is one means to obtain an earlier priority date for water that may be needed to meet existing uses and projected municipal growth. However, the existing water agreements with the Pondera County Canal and Reservoir Company should supply more than enough water for existing and future municipal growth, and the PCCRC water rights date from before 1912. (Pondera County Canal and Reservoir Company Exh. 1, p. 8 and Att. F).

8. The growth of a community is dependent on the availability of a reliable and potable drinking water supply. (Bd. Exh. 10-A, p. 48).

9. The City of Conrad is a legal shareholder in the Pondera County Canal and Reservoir Company, which entitles the City to a shareholder portion of the water in Lake Frances. (Pondera County Canal and Reservoir Company Exh. 1, p. 10). Before the City of Conrad could develop the proposed reservation, it would have to obtain authorization from the Pondera County Canal and Reservoir Company to change its point of diversion (Bd. Exh. 10-A, p. 7).

10. The City of Conrad hold shares in the Pondera County Canal and Reservoir Company (PCCRC), and the PCCRC will continue to provide the City with sufficient water from Lake Frances to meet its future needs (Pondera County Canal and Reservoir Company Exh. 1, p. 8). In normal years, shares of the Pondera County Canal and Reservoir Company provide the city with a full 1.5 acre feet (af) per share. (Bd. Exh. 10-A, pp. 5 and 6). The City of Conrad's full share allocation from Lake Frances is 3,270 af of water. (Bd. Exh. 10-A, p. 4). During very dry years, any water shortages in Lake Frances are prorated among the shareholders and a shareholder may receive as little as .5 af per share, with the City receiving as little as 1,090 af during severe drought years. (Bd. Exh. 10-A, p. 6). Conrad projects that its future population of 4,520 in the year 2025 using 261 gallons per person daily would need 1,323 af per year, causing a shortage of 233 af during severe drought years (Bd. Exh. 10-C, p. 3). With the same projected population in the year 2025 using the present average of 203 gallons per person daily, the City of Conrad would need 1,030 af in the year 2025, having a 60 af surplus even during a

severe drought year. A reasonable population projection of 3,100 in the year 2025 using 250 gallons per person daily would need 870 acre feet per year, providing a 220 af cushion during a severe drought year.

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CONRAD (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3)).

11. The method of determining the amount of water requested for a water reservation by the City of Conrad was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35). The methodology used by the City of Conrad projected an average annualized (compounded population growth rate) of approximately .77 percent. (Bd. Exh. 40, p. 236). The population of the City of Conrad in the year 1990 was 2,891. (Bd. Exh. 40, p. 236). Based on the 1980 city population of 3,074 and an annualized growth rate of .77 percent, Conrad's projected population for the year 2025 would be 4,338 people. (Bd. Exh. 10-C, p. 7).

12. The methodologies and assumptions used by the City of Chester are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a)). The populations recorded in the 1990 census indicate that over the past 30 years Conrad has experienced very slow population growth of .27 percent per year annualized (from 2,665 people in the year 1960 to 2,891 people in 1990) and has lost population over the last decade (Bd. Exh. 10-C, p. 7a). A more accurate population projection for the City of Conrad is 3,100 people in the year 2025, based on a .21 percent annualized growth rate, which is the average City growth rate over the past 20 years. An additional 4 percent of residents who live outside the city limits are provided with city water services. (Bd. Exh. 10-A, pp. 18 and 19).

13. The City of Conrad estimates that it loses a modest 5 percent of its water diversions to system operations and leakage. (Bd. Exh. 10-A, p. 22). Conrad's average usage of 203 gallons per person daily is lower than the typical basin municipal use rates of 250 gallons per person daily, quite possibly because of high water costs of $1.76 /1000 gallons. (Bd. Exh. 10-A, pp. 22 and 25; Bd. Exh. 9-C, p. 3). The City expects per capita water use rates to increase to 261 gallons per person daily, but does not give a reason for the projected increase (Bd. Exh. 10-A, p. 28 - 30).

14. Approximately 31 percent of the city water service connections are metered at present. (Bd. Exh. 10-C, p. 5). The City of Conrad meters new connections to the water system. (Bd. Exh. 10-C, p. 5). The city is considering additional metering of existing unmetered water connections. (Bd. Exh. 10-C, p. 5). The City expects metering would reduce water consumption by

approximately 20 percent compared to nonmetered water connections. (Bd. Exh. 10-A, pp. 27 and 49).

15. The water use efficiencies associated with the proposed water reservation uses by the City of Conrad are not reasonable. (ARM 36.16.107B(3)(b)). The City does not provide a reason for the projected 28 percent increase in per capita water use, while the use of increased metering and elevated water costs from the proposed development would be expected to decrease per capita water use rates.

16. City metering of the presently unmetered 69 percent of City water connections would easily meet any additional water demands from the projected seven percent population increase over the next 35 years. This cost-effective measure could maintain or reduce per capita usage rates in the City of Conrad and would eliminate the any need for a water reservation. (ARM 36.16.107B(3)(b)). The costs of developing a new water reservation diversion location and the associated expansion of the water treatment plant may exceed the financial capabilities of the City of Conrad (Bd. Exh. 10-A, p. 59).

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF CONRAD IS NOT IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(iv)(1991); ARM 36.16.107B(4)).

17. Based on the finding of fact that the amount of water sought by the City of Conrad is not needed, the reservation by the City of Conrad would not be in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4)).

III. CONCLUSIONS OF LAW

1. The City of Conrad is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Conrad's application is for beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Conrad has not been established. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The City of Conrad has not established that its water reservation is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

IV. ORDER

1. The water reservation application for the City of Conrad is denied.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF CUT BANK TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Cut Bank is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh.17-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Cut Bank has applied for a water reservation of 890 acre-feet/year (af/yr) of water with a maximum diversion rate of 3.37 cubic feet/second (cfs) to be diverted from Cut Bank Creek for year round use. (Bd. Exh. 17-A, p. 6.) The city is also requesting that 400 af/yr of the reserved water possibly be stored in off-stream storage located north of the water treatment plant (Bd. Exh. 17-C, p. 1.)

3. The City of Cut Bank requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 17-A, p. 4.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF CUT BANK (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b.)

4. The City of Cut Bank seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 17-A, p. 6.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 17-A, p. 4.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CUT BANK (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. Cut Bank Creek presently provides generally adequate flows of 1.31 cfs of water to the City of Cut Bank. (Bd. Exh. 17-A, p. 6, and Cut Bank Exh. 1, Appendix D). The reservation water requested would be delivered through the existing city infiltration gallery with up to 400 af/yr to be stored in a proposed reservoir north of the water treatment plant. (Bd. Exh. 17-A, p. 6, and Bd. Exh. 17-C, pp. 1 and 3a.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal and industrial growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 17-A, p. 8.)

8. It is important that the City of Cut Bank have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 17-A, p. 37.)

9. Competing water uses may prevent the City of Cut Bank from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Cut Bank may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF CUT BANK (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Cut Bank was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 15.) The methodology used by the City of Cut Bank projected an average annualized (compounded population growth rate) of approximately 1.10 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Cut Bank was 3,329. (Bd. Exh. 40, p. 236.) The City of Cut Bank's population forecast for the year 2025 was 6,069 people. (Bd. Exh. 40, p. 236.)

11. The 1990 census indicates that Cut Bank's population has steadily declined for the last 30 years at an average annualized rate of -1.03 percent per year from 4,539 people in 1960 to 3,329 currently. (Bd. Exh. 17-C, p. 7a.) The city provides additional water services to approximately 17 percent of the residents living outside the city limits. (Bd. Exh. 17-A, p. 19.)

12. The City of Cut Bank uses an average of 228 gallons per person daily, (Bd. Exh. 17-C, p. 3.) indicating a very low rate of system leakage (about 2 percent). (Bd. Exh. 17-A, p. 33.)

13. One hundred percent of Cut Bank's water services are metered at present. (Bd. Exh. 17-C, p. 4.) The city will continue to meter 100 percent of its services (Bd. Exh. 17-A, p. 60.) The City of Cut Bank estimates its future daily water usage at 254 gallons per person (Bd. Exh. 17-C, p. 3), which is very close to the 250 gallons per person typical of basin municipal systems. (Bd. Exh. 17-A, p. 22, and Bd. Exh. 7-A, pp. 24 and 25.)

14. The water use efficiencies associated with the municipal and industrial uses by the City of Cut Bank are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Cut Bank and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY CITY OF CUT BANK IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Cut Bank's water reservation were calculated on a willingness-to-pay basis. Cut Bank used a $1.50/1,000 gallons value. (Bd. Exh. 17-A, p. 46.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $.89/1,000 gallons. (Bd. Exh. 17-C, p. 5.)

18. The direct benefits of the City of Cut Bank's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Cut Bank's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 17-A, p. 49.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 17-A, p. 49.)

21. Other than conversion of 100 acres of land to a water reservoir, there are no significant adverse environmental impact associated with the use of the City of Cut Bank's water reservation. (Bd. Exh. 17-A, p. 50.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 17-A.)

22. Net benefits of granting the City of Cut Bank's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Cut Bank identified two alternative sources of water for future development, on-stream storage and a regional reservoir. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 17-A, p. 48) and are not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of Cut Bank is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 17-A, p. 50; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Cut Bank's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Cut Bank will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 17-A; ARM 36.16.107B(5) and (6).)

27. The City of Cut Bank has identified a management plan for the designed, development, and administration of its water reservation. (Bd. Exh. 17-A, p. 52.)

28. The City of Cut Bank is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Cut Bank's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

30. As conditioned, the City of Cut Bank's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Cut Bank is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Cut Bank's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Cut Bank has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Cut Bank are suitable but not accurate under present conditions. (ARM 36.16.107(3)(a).) A more accurate population projection for the year 2025 for the City of Cut Bank is 3,800 people based on an annualized .38 percent growth rate. As modified, the City of Cut Bank has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Cut Bank as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Cut Bank is granted for the following amount and flow of water: 1.42 cfs and 400 af/year.

2. The point of diversion and places of use are as set forth in the reservation application City of Cut Bank and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Application of City of Dillon
Water Reservation No. 70270-41B

II. FINDINGS OF FACT

1. An application for reservation of water for municipal and other uses was filed by the City of Dillon. (Bd. Exh. 16-A.)

2. This Applicant failed to appear at the hearing and failed to produce witnesses to testify or defend its application. The Montana Power Company and other objectors had indicated prior to hearing that they would cross-examine witnesses who authored or were familiar with the application. Objectors also presented testimony and exhibits contesting the merits of the application. The City of Dillon presented no witnesses and the Montana Power Company moved to dismiss the application. (Tr. Day 2, pp.20, 87-90.)

3. Although the application was admitted into the record as *prima facie* evidence, it is fundamental that objectors have a right to cross-examine the authors or those familiar with the applications. Evidence refuting the applications was also received.

III. ORDER

1. The water reservation application for the City of Dillon is denied.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF CITY OF EAST HELENA TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of East Helena is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 14-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of East Helena has applied for a water reservation of 258 acre-feet/year (af/yr) of water with a maximum diversion rate of .93 cubic feet/second (cfs) to be diverted from McClellan Creek or withdrawn from the Helena valley groundwater by a proposed well for year round use. (Bd. Exh. 14-A, pp. 3, 5.)

3. The City of East Helena requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 14-A, p. 3.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF EAST HELENA (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of East Helena seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 14-A, p.5.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 14-A, p. 3.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF EAST HELENA (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. East Helena's McClellan Creek infiltration gallery, and the Jackson, Lost and Crystal Creeks collection system and the city's Prickly Pear well field presently provides up to 2.7 cfs of water to the City of East Helena. (Bd. Exh. 14-A, p. 32.) The reservation water requested would be delivered from the McClellan Creek infiltration gallery (up to .93 cfs) or from a new well in the city well field located 2 miles north of East Helena along Prickly Pear Creek (up to .93 cfs). (Bd. Exh. 14-C, pp. 1, 3.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal and industrial growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 14-A, p. 6.)

8. It is important that the City of East Helena have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 14-A, p. 3 A.)

9. Competing water uses may prevent the City of East Helena from obtaining or perfecting a water use permit in the future. Without a reservation, the City of East Helena may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF EAST HELENA (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of East Helena was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of East Helena projected an average annualized (compounded population growth rate) of approximately 1.30 percent. (Bd. Exh. 40, p. 236.) The 1990 population of East Helena was 1,538. (Bd. Exh. 40, p. 236.) The City of East Helena's population forecast for the year 2025 was 2,938 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that East Helena has grown at an annualized rate of .11 percent per year over the past 30 years (1,490 people in 1960 to 1,538 people in 1990). (Bd. Exh. 14-C, p. 11.)

12. The City of East Helena has a noticeable rate of leakage of 100 gallons per person per day (estimated 29 percent leakage rate). (Bd. Exh. 14-A, pp. 22-23.) However, these distribution system leakages are expected to be reduced to approximately 30 gallons per person per day. (Bd. Exh. 14-C, p. 2; Bd. Exh. 14-A, p. 24.) The City of East Helena expects its future average per capita water usage will be 250 gallons per person daily, which is typical of basin use rates (Bd. Exh. 14-A, pp. 22, 24.) The McClellan Creek water source is an unreliable late summer supply, is a tributary of Prickly Pear Creek which is highly appropriated, and could not provide additional water unless storage is built. (Bd. Exh. 14-B, p. 3.)

13. None of the City of East Helena water services are metered at present. (Bd. Exh. 14-A, p. 22.) The City of East

Helena has no plans to initiate metering in the near future. (Bd. Exh. 14-C, p. 4.)

14. The water use efficiencies associated with the municipal and industrial uses by the City of East Helena are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of East Helena and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF EAST HELENA IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of East Helena's water reservation were calculated on a willingness-to-pay basis. East Helena used a $1.50/1,000 gallons value. (Bd. Exh. 14-A, p. 39.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $.92/1,000 gallons. (Bd. Exh. 14-A, p. 39.)

18. The direct benefits of the City of East Helena's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of East Helena's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 14-A, p. 41.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 14-A, p. 40.)

21. There is no significant adverse environmental impact associated with the use of the City of East Helena's water reservation. (Bd. Exh. 14-C, p. 6.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Board Exhibit 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 14 - A.)

22. Net benefits of granting the City of East Helena's water reservation exceed the net benefits of not granting the

water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of East Helena identified one alternative sources of water for future development, the Helena Valley Regulating Reservoir. This alternative would not provide greater net benefits than the water reservation, (Bd. Exh. 14-A, pp. 35-36) and is not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of East Helena is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 14-A; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of East Helena's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of East Helena will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 14-A; ARM 36.16.107B(5) and (6).)

27. The City of East Helena has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 14-A, pp. 43-52.)

28. The City of East Helena is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of East Helena's water reservation is July 1, 1985. (§ 85-2-331(4).)

30. As conditioned, the City of East Helena's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of East Helena is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of East Helena's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of East Helena has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of East Helena are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) A more accurate population projection for the year 2025 for the City of East Helena is 1,700 based on an annualized growth rate of .30 percent per year. As modified, the City of East Helena has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of East Helena as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of East Helena is granted for the following amount and flow of water: .93 cfs and 258 af/year from a well diverting Helena valley groundwater.

2. The point of diversion and place of use are from the well set forth in the reservation application City of East Helena and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted t all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF FAIRFIELD TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Fairfield is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 11-A, p. 1; § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Fairfield has applied for a water reservation of 325 acre-feet/year (af/yr) of water with a maximum diversion rate of .34 cubic feet/second (cfs) to be diverted from existing city wells to proposed water pond or ice mound storage for year round use. (Bd. Exh. 11-A, pp. 6 and 7.)

3. The City of Fairfield requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 11-A, p. 4.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF FAIRFIELD (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Fairfield seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 11-A, p. 6.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 11-A, p. 4.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF FAIRFIELD (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. Seven shallow wells presently provide an average of .31 cfs of water to the City of Fairfield. (Bd. Exh. 11-A, pp. 4 and 17.) The reservation water requested would be delivered from existing wells to the water pond/ice mound recharge area. (Bd. Exh. 11-A, pp. 6 and 7.) One or two additional wells may be drilled to provide water for the recharge area (Bd. Exh. 7-A, p. 26.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected

municipal and industrial growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 11-A, p. 8.)

8. It is important that the City of Fairfield have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 11-A, pp. 9 and 10.)

9. Competing water uses may prevent the City of Fairfield from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Fairfield may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF FAIRFIELD (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Fairfield was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of Fairfield projected an average annualized (compounded population growth rate) of approximately .70 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Fairfield was 660. (Bd. Exh. 40, p. 236.) The City of Fairfield's population forecast for the year 2025 was 888 people. (Bd. Exh. 40, p. 236.)

11. The City of Fairfield probably has minor rates of leakage. (Bd. Exh. 11-A, p. 21.) Average city daily use rates of 309 gallons per person are 24 percent higher than typical water use rates of 250 gallons per person daily. (Bd. Exh. 11-C, p. 2; Bd. Exh. 11-A, p. 21.) Use rates are expected to decline slightly as portions of the system are metered (Bd. Exh. 11-A, p. 23.)

12. About nine percent of the city water services are metered at present. (Bd. Exh. 11-A, p. 21.) The City of Fairfield expects that meters will be added to a portion of the services in the future. (Bd. Exh. 11-A, p. 23.)

13. The water use efficiencies associated with the municipal and industrial uses by the City of Fairfield are reasonable. (ARM 36.16.107B(3)(b).)

14. Except for completion of water service metering, no other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Fairfield and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF FAIRFIELD IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

15. Benefits of the City of Fairfield's water reservation were calculated on a willingness-to-pay basis. Fairfield used a $1.50 to 3.00/1,000 gallons value. (Bd. Exh. 11-A, p. 38.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

16. The additional water provided by the water reservation will cost approximately $2.20/1,000 gallons. (Bd. Exh. 11-C, p. 4.)

17. The direct benefits of the City of Fairfield's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

18. Indirect benefits of the City of Fairfield's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 11-A, p. 40.)

19. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 11-A, p. 39.)

20. There is no significant adverse environmental impact associated with the use of the City of Fairfield's water reservation. (Bd. Exh. 11-C, p. 5.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Board Exhibit 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 11- A.)

21. Net benefits of granting the City of Fairfield's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

22. The City of Fairfield identified two alternative sources of water for future development, a Sun River well field and the northeast well field. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 11-A, p. 34) and are not reasonable. (ARM 36.16.107B(4)(c).)

23. Failure to reserve water for future municipal and industrial use by the City of Fairfield is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 11-A, p. 41; ARM 36.16.107B(4)(d).)

24. As conditioned, the City of Fairfield's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF FAIRFIELD IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

25. The water reservation by the City of Fairfield will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 11-A; ARM 36.16.107B(5) and (6).)

26. The City of Fairfield has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 11-A, p. 42.)

27. The City of Fairfield is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

28. The priority date of the City of Fairfield's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

29. As conditioned, the City of Fairfield's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

30. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Fairfield is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Fairfield's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Fairfield has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Fairfield are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) As modified, the City of East Helena has

established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Fairfield as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Fairfield is granted for the following amount and flow of water: .43 cfs and 325 af/year.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Fairfield and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF FORT BENTON TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Fort Benton is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 12-A , p. 1; § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Fort Benton has applied for a water reservation of 89 acre-feet/year (af/yr) of water with a maximum diversion rate of .76 cubic feet/second (cfs) to be diverted from the Missouri River for year round use. (Bd. Exh. 12-A, pp. 3-5.) In addition, the City has applied for .67 cfs (up to 35 af/yr) for irrigating new parks between April 1 and October 1 of each year. (Bd. Exh. 12-C, p. 3.)

3. The City of Fort Benton requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 12-A, p. 3.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF FORT BENTON (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Fort Benton seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 12-A, p. 30.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 12-A, p. 3.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF FORT BENTON (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The Missouri River presently provides a reliable water supply averaging 1.05 cfs to the City of Fort Benton. (Bd. Exh. 12-A, p. 17.) The reservation water requested would be delivered from the recently developed Raney Well system in the Missouri River. (Bd. Exh. 12-A, p. 5.) Water for new city parks would be delivered through the existing municipal water system from the Missouri River (Bd. Exh. 12-A, p. 3.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal and industrial growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 12-A, pp. 6-7.)

8. It is important that the City of Fort Benton have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 12-A, p. 32.)

9. Competing water uses may prevent the City of Fort Benton from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Fort Benton may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF FORT BENTON (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Fort Benton was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of Fort Benton projected an average annualized (compounded population growth rate) of approximately .86 percent. (Bd. Exh. 40, p. 246.) The 1990 population of the City of Fort Benton was 1,660. (Bd. Exh. 40, p. 236.) The City of Fort Benton's population forecast for the year 2025 was 2,489 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that the City of Fort Benton has lost about 12 percent of its population between 1960 and 1990 (from 1,887 to 1,660 persons at present). (Bd. Exh. 12-C, p. 5-a.)

12. The Board takes notice of the proposed development of the Bureau of Land Management interpretive center to be located in Fort Benton. If this development proceeds, the amount of water needed to service this facility and visitors will increase. The Board takes notice of this fact pursuant to Mont. Code Ann. § 2-4-612(6). This information was not available at time of hearing.

13. The City of Fort Benton experiences high system leakage rates (up to 35 percent). (Bd. Exh. 12-A, p. 23.) However, the city expects to reduce leakage by more than 100 gallons per capita daily by replacing old pipe and repairing taps. (Bd. Exh. 12-A, p. 24; Bd. Exh. 12-C, p. 2.) These improvements are expected to reduce per person daily water use by 26 percent (from 406 gallons to 300 gallons). (Bd. Exh. 12-C, p. 2.) This future

rate would be slightly above the 250 gallons per person daily rates typical of Missouri basin communities. (Bd. Exh. 12-A, p. 22.)

14. The city meters 195 of the 945 connections on the water system. (Bd. Exh. 12-C, p. 3.) The City of Fort Benton has no immediate plans to increase the use of metering (Bd. Exh. 12-C, p. 3) although it eventually intends to meter its system. (Bd. Exh. 12-A, p. 42.) The parkland irrigation efficiencies are reasonable. (Bd. Exh. 12-C, p. 3.)

15. As described above, the water use efficiencies associated with the municipal and industrial uses by the City of Fort Benton are reasonable. (ARM 36.16.107B(3)(b).)

16. No other cost-effective measures, in addition to those listed above, could be taken within the reservation term to increase the use efficiency by the City of Fort Benton and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF FORT BENTON IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

17. Benefits of the City of Fort Benton's water reservation were calculated on a willingness-to-pay basis. Fort Benton used a $1.50/1,000 gallons value. (Bd. Exh. 12-A, p. 38.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

18. The additional water provided by the water reservation will cost approximately $.79/1,000 gallons. (Bd. Exh. 12-A, p. 39.)

19. The direct benefits of the City of Fort Benton's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

20. Indirect benefits of the City of Fort Benton's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 12-C, p. 40.)

21. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 12-A, p. 39.)

22. There is no significant adverse environmental impact associated with the use of the City of Fort Benton's water reservation. (Bd. Exh. 12-A, p. 40.) The effects of individual

municipal water reservation depletions on water quality have not been quantified (Board Exhibit 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 12- A.)

23. Net benefits of granting the City of Fort Benton's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

24. The City of Fort Benton identified three alternative sources of water for future development: renovation of the water treatment plant, Raney well induced infiltration and an alluvial well field. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 12-A, pp. 32 and 33) and are not reasonable. (ARM 36.16.107B(4)(c).)

25. Failure to reserve water for future municipal and industrial use by the City of Fort Benton is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 12-A, p. 41; ARM 36.16.107B(4)(d).)

26. As conditioned, the City of Fort Benton's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

27. The water reservation by the City of Fort Benton will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 12-A, p. 14; ARM 36.16.107B(5) and (6).)

28. The City of Fort Benton has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 12-A, p. 43.)

29. The City of Fort Benton is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

30. The priority date of the City of Fort Benton's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

31. As conditioned, the City of Fort Benton's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

32. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Fort Benton is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Fort Benton's application is for beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Fort Benton has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Fort Benton are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) As modified, the City of Fort Benton has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Fort Benton as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Fort Benton is granted for the following amount and flow of water: 89 af/year with a maximum diversion rate of .76 cfs for year round use and .67 cfs up to 35 af/year for use between April 1 and October 1.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Fort Benton and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted t all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Specific reservation conditions (for this reservation)

A. This amount of 89 af/year with a maximum diversion rate of .76 cfs for year round use is conditioned on the development of the Bureau of Land Management interpretive center and related increased water demands.

Application of City of Great Falls
Water Reservation No. 71890-41K

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF GREAT FALLS TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Great Falls is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 13-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Great Falls has applied for an amended water reservation of 6,022 acre-feet/year (af/yr) of water with a maximum diversion rate of 11.5 cubic feet/second (cfs) to be diverted from the Missouri River for year round use. (Bd. Exh. 13-C, p. 2 and Great Falls Exh. 2, p. 4.) The City of Great Falls has also applied for 233.5 af/yr (4.45 cfs peak) from the Missouri River and for 233.5 af/yr (4.45 cfs peak) from the Sun River for parks irrigation. (Bd. Exh. 13-A, p. 6.) If the water adjudication process should reduce the city's existing Missouri River water claims, the City has conditionally applied for a reservation for water to be placed in storage; either water purchased from Canyon Ferry Reservoir or placed in a city developed 1,289 af reservoir at an unspecified location. (Bd. Exh. 12-A, p. 33.) The city need for storage is necessary if certain claimed rights of the City of Great Falls have not been beneficially used. (Bd. Exh. 12-A, p. 33.)

3. The City of Great Falls requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 13-A, p. 1.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF GREAT FALLS (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Great Falls seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 13-A, p. 4.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 13-A, p. 2.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF GREAT FALLS (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The Missouri River presently provides up to 71.5 cfs of direct flow water to the City of Great Falls. (Bd. Exh.13-A, p. 4.) The reservation water requested would be delivered through the existing municipal water supply system. (Bd. Exh. 13-A, p. 2.) The reservation water requested for parks irrigation uses would be diverted directly from the Missouri and Sun Rivers. (Bd. Exh. 13-A, p. 6.) The source and delivery system for the possible water storage reservation is unknown, with possible storage locations including Canyon Ferry Reservoir or an off-stream storage site near the City of Great Falls. (Bd. Exh. 13-A, pp. 4 and 6.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 13-A, pp. 10 and 11.)

8. It is important that the City of Great Falls have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 13-A, p. 12.)

9. Competing water uses may prevent the City of Great Falls from obtaining or perfecting a water use permit in the future. (Bd. Exh.13-A, pp. 10-12.) Without a reservation, the City of Great Falls may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF GREAT FALLS (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Great Falls was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 236.) The methodology used by the City of Great Falls projected an amended average annualized (compounded population growth rate) of approximately .50 percent. (Great Falls Exh. 2, Jacobson Dir., p. 2) The 1990 population of Great Falls was 55,097 persons, a three percent decrease from the 1980 census. (Bd. Exh. 40, p. 236.) The City of Great Falls' revised population forecast for the year 2025 was 65,605 people. (Bd. Exh. 41, p. 101.) The City of Great Falls supplies an additional 12.5 percent of its water to customers outside the city limits. (Bd. Exh. 13-A, pp. 22 and 36.)

11. The populations recorded in the 1990 census indicate that the city population has been relatively stable from 1970 to the present. (Bd. Exh. 13-A, p. 15.)

12. The City of Great Falls has a low rate of leakage, estimated at 5 to 10 percent. (Bd. Exh. 13-A, p. 29.) Great Falls average use level of 191 gallons per person per day is lower than typical basin rates of 250 gallons per person daily. (Bd. Exh. 13-A, p. 29.)

13. The City of Great Falls is 100 percent metered at present. (Great Falls Exh. 2, Jacobson Dir., p. 3.)

14. The water use efficiencies associated with the municipal and industrial uses by the City of Great Falls are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Great Falls and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF GREAT FALLS IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Great Falls' water reservation were calculated on a willingness-to-pay basis. Great Falls used a $1.50/1,000 gallons value. (Bd. Exh. 13-A, p. 50.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $.13/1,000 gallons without additional costs to expand the distribution system. (Bd. Exh. 13-C, p. 6.)

18. The direct benefits of the City of Great Falls' water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Great Falls' reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 13-A, p. 51.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 13-A, p. 50.)

21. There is no significant adverse environmental impact associated with the use of the City of Great Falls' water

reservation. (Bd. Exh. 13-C, p. 6.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 13 - A.) No non-quantifiable benefits or costs were identified. (Bd. Exh. 13-C.)

22. Net benefits of granting the City of Great Falls' water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Great Falls identified four alternative sources of water for future development. Chowen Springs, Giant Springs, alluvial aquifers and the Madison aquifer alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 13-A, pp. 40 to 46) and are not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of Great Falls is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 13-A, p. 52; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Great Falls' water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Great Falls will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 13-A; ARM 36.16.107B(5) and (6).)

27. The City of Great Falls has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 13-A, p. 54.)

28. The City of Great Falls is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Great Falls' water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

30. As conditioned, the City of Great Falls' water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

34. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Great Falls is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Great Falls' application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Great Falls has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and revised assumptions used by the City of Great Falls are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) As modified, the City of Great Falls has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation requests by the City of Great Falls as modified herein are in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Storage of up to 1,289 af of water would be concurrent and within the amounts of adjudicated water rights and approved reservations. Therefore, the reservation for water to be stored is needed only to the extent the City of Great Falls is not able to use its claimed water. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Great Falls is granted for the following amount and flow of water: 11.5 cfs and 6,022 af/year for municipal and industrial uses and 8.9 cfs and 467 af/year (from April 1 to October 1 of each year) is for parks irrigation.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Great Falls and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF HELENA TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Helena is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 15-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Helena has applied for a water reservation of 7,071 acre-feet/year (af/yr) of water with a maximum diversion rate of 16.4 cubic feet/second (cfs) to be diverted from a deep alluvial groundwater aquifer using a well field located near Prickly Pear Creek for year round use. (Bd. Exh. 15-C, p. 1-2.)

3. The City of Helena requested a water reservation to meet future demands by municipal and industrial users and to protect the quality of its municipal water supply. (Bd. Exh. 15-C, p. 1.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF HELENA (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

4. The City of Helena seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The requested term of the water reservation is to year 2035. (Bd. Exh. 15-A, p. 1-5.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 15-C, p. 1.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF HELENA (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

6. The Tenmile Water Supply, Missouri River Water Supply, Eureka Station and Hale system presently provides an average of 9.27 cfs of high quality water to the City of Helena. (Bd. Exh. 15-A, p. 3-10, and Bd. Exh. 15-C, p. 3.) Because of possible water quality problems (Bd. Exh. 15-C, p. 3), the Missouri River system (5.22 average cfs and 13.9 peak cfs) cannot be considered a firm, long-term, all season water supply (Bd. Exh. 15-C, p. 3, and Bd. Exh. 15-A, p. 3-11.) The reservation water requested

would be delivered from a well field located northeast of the City of Helena's Missouri River Water Treatment Plant drawing from a deep alluvial groundwater aquifer. (Bd. Exh. 15-C, p. 2; Helena Exh. 1, Att. 1-map.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal and industrial growth and to protect the quality of the city water supply. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 15-A, p. 2-1.)

8. It is important that the City of Helena have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 15-A, p. 1-4.)

9. Competing water uses may prevent the City of Helena from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Helena may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF HELENA (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Helena was based on a forecast of its future population to the year 2035 along with the estimated amount of water used per person. (Bd. Exh. 15-C, p. 5.) The methodology used by the City of Helena projected an average annualized (compounded population growth rate) of approximately .50 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Helena was 24,564. (Bd. Exh. 40, p. 236.) The City of Helena's population forecast for the year 2035 is 31,624 people. (Bd. Exh. 40, p. 236.)

11. The methodologies and assumptions used by the City of Helena are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) The populations recorded in the 1990 census indicate that Helena grew at an annualized rate of .65 percent between the years 1960 and 1990. Therefore, the city's growth forecast of 31,624 people seems low. (Bd. Exh. 15-C, p. 10.)

12. The City of Helena water system has a low 9 percent rate of leakage (estimated .75 cfs out of 9.27 cfs used daily). (Bd. Exh. 15-A, p. 3-14 to 3-15.)

13. Helena presently meters 99 percent of its water users. (Bd. Exh. 15-C, p. 7.) The City of Helena will continue to require metering. (Bd. Exh. 15-C, p. 7.) Helena water system

users presently consume 228 gallons of water per person daily and the city projects that future use will be 250 gallons per person daily (a typical basin use rate). (Bd. Exh. 15-C, p. 5, and Bd. Exh. 15-A, p. 3-14.)

14. The water use efficiencies associated with the municipal and industrial uses by the City of Helena are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Helena and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF HELENA IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Helena's water reservation were calculated on a willingness-to-pay basis. Helena used a $2.47/1,000 gallons value which is what Helena municipal users are curretly paying. (Bd. Exh. 40, p. 253.) (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $.50/1,000 gallons. (Bd. Exh. 15-C, p. 8.)

18. The direct benefits of the City of Helena's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Helena's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 15-A, p. 4-2.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 15-A, p. 4-8.)

21. Impacts of well field development on aquifers and surface flows are difficult to predict (Bd. Exh. 41, p. 63.) With a minor hydrologic connection between Prickly Pear Creek and the proposed deep wells, there should be no significant adverse environmental impact associated with the use of the City of Helena's water reservation. (Bd. Exhibit Helena No. 15-A, pp. 4-9.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exhibit 40, pp. 253-254), but should be very small. Any resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 15-A.)

22. Net benefits of granting the City of Helena's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Helena identified one alternative source of water for future development: modification of the Missouri River Water Treatment Plant to remove arsenic and toxic algae. This alternative would not provide greater net benefits than the water reservation, (Bd. Exh. 15-A, p. 4-4) and is not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of Helena is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 15-A, p. 4-10; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Helena's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b)(5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Helena will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 15-A; ARM 36.16.107B(5) and (6).)

27. The City of Helena has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 15-A, pp. 5-1 to 5-16.)

28. The City of Helena is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Helena's water reservation is July 1, 1985. (§ 85-2-331(4).)

30. As conditioned, the City of Helena's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Helena is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Helena's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Helena has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Helena are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) As modified, the City of Helena has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Helena as modified and conditioned herein is in the public interest. (§ 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the City of Helena is granted for the following amount and flow of water: 16.4 cfs and 7,071 af/year.

2. The point of diversion and places of use are as set forth in the reservation application City of Helena and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF LEWISTOWN TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Lewistown is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 1-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Lewistown has applied for a water reservation of 2,966 acre-feet/year (af/yr) of water with a maximum diversion rate of 3.57 cubic feet/second (cfs) to be diverted from Big Spring Creek for year round use. (Bd. Exh. 1-A, p. 3.)

3. The City of Lewistown requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 1-A, p. 3.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF LEWISTOWN (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

4. The City of Lewistown seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing all users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 1-A, p. 3.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 1-A, p. 3.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF LEWISTOWN (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

6. Big Spring Creek presently provides constant flows of high quality water to the City of Lewistown. (Bd. Exh. 1-C, pp. 2 and 6.) The reservation water requested would be delivered by the present distribution system after modifications and improvements. (Bd. Exh. 1-C, p. 5.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected

municipal growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 1-A, pp. 7-10.)

8. It is important that the City of Lewistown have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 1-A, p. 42.)

9. Competing water uses may prevent the City of Lewistown from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Lewistown may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF LEWISTOWN (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Lewistown was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 236.) The methodology used by the City of Lewistown projected an average annualized (compounded population growth rate) of approximately 0.68 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Lewistown was 6,051. (Bd. Exh. 40, p. 236.) Based on the 1980 census population of 7,104 people, the City of Lewistown's population forecast for the year 2025 was 9,618 people. (Bd. Exh. 1-C, p. 8.)

11. The 1990 census of 6,051 people indicates that Lewistown has lost about 15% of its population during the 1980s, and that the city population generally has been declining since a 1960 population peak of 7,408. (Bd. Exh. 1-C, p. 8.)

12. The City of Lewistown experiences approximately 2 million gallons per day water losses from leaks in its 10-mile long transmission pipeline from Big Springs. (Bd. Exh. 1-A, p. 31; Bd. Exh. 1-C, pp. 2-4.) However, it is not presently cost-effective to replace this leaking transmission pipeline. (Bd. Exh. 1-C, p. 5; Bd. Exh. 1-A, p. 46.) Installation of water meters will reduce daily per capita use rates by 20 to 30 percent (Bd. Exh. 1-A, p. 55.) Lewistown expects that its metering program and repairs of leaky pipelines within its distribution system will reduce future needs by 28 percent; from an average of 533 gallons per person daily to 382 gallons per person daily (Bd. Exh. 1-A, p. 32.) The City of Lewistown's water usage would remain substantially above typical basin per capita usage rates of 250 gallons per person daily. (Bd. Exh. 1-A, p. 27.)

13. Approximately 16% of the services (primarily commercial and industrial users) are metered at present. (Bd. Exh. 1-A, p. 27.) Lewistown is considering improvements in the city distribution system with a goal of 100% metering. (Bd. Exh. 1-A, p. 55.) The city currently requires metering for all new connections to the water system. (Bd. Exh. 1-C, p. 6.)

14. As described above, the water use efficiencies associated with the municipal and industrial uses by the City of Lewistown are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure in addition to those listed above could be taken within the reservation term to increase the use efficiency by the City of Lewistown and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

16. The City of Lewistown claims water rights of 9.05 million gallons per day (14.0 cfs) flows, and a total volume of 2,221 acre-feet volume. (Bd. Exh. 1-A, p. 33.)

17. The City of Lewistown's present peak use rate is slightly less than its water rights claims of 14.0 peak cfs. (Bd. Exh. 1-A, pp. 33-34.) The city will need a peak use rate of 15.1 cfs to serve a projected city population of 7,400 people (8,100 people in service area).

18. The City of Lewistown's projected needs will be 3,468 acre-feet per year to serve 7,400 residents (8,100 people in service area) who use an average of 382 gallons per person daily. (Bd. Exh. 1-A, p. 32.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF LEWISTOWN IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

19. Benefits of the City of Lewistown's water reservation were calculated on a willingness-to-pay basis. Lewistown used a $1.50/1,000 gallons value. (Bd. Exh. 1-A, p. 50.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

20. The additional water provided by the water reservation will cost approximately $0.57/1,000 gallons. (Bd. Exh. 1-C, p. 7.)

21. The direct benefits of the City of Lewistown's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

22. Indirect benefits of the City of Lewistown's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and

income tax base from increased population. (Bd. Exh. 1-A, p. 52.)

23. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 1-A, p. 52.)

24. There is no significant adverse environmental impact associated with the use of the City of Lewistown's water reservation. (Bd. Exh. 1-C, p. 7.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 1-C.)

25. Net benefits of granting the City of Lewistown's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

26. The City of Lewistown identified two possible alternative sources of water for future development, a treatment plant at Big Spring Creek and deep wells. Neither of these alternatives would provide greater net benefits than the water reservation, (Bd. Exh. 1-A, pp. 50-52) and are not reasonable. (ARM 36.16.107B(4)(c).)

27. Failure to reserve water for future municipal and industrial use by the City of Lewistown is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 1-C, p. 54; ARM 36.16.107B(4)(d).)

28. As conditioned, the City of Lewistown's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

29. The water reservation by the City of Lewistown will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 1-A; ARM 36.16.107B(5) and (6).)

30. The City of Lewistown has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 1-A, pp. 56-66.)

31. The City of Lewistown is capable of exercising reasonable diligence towards feasibly financing the project and

applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

32. The priority date of the City of Lewistown's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

33. As conditioned, the City of Lewistown's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

34. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Lewistown is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Lewistown's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Lewistown has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Lewistown are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) A more accurate population projection for the year 2025 for the City of Lewistown is 7,400 persons based on an average annualized growth rate of .58 percent. As modified, the City of Lewistown has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Lewistown as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Lewistown is granted for the following amount and flow of water: 1.1 cfs and 1,247 af/year.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Lewistown and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Application of Power-Teton Water and Sewer District
Water Reservation No. 72575-41K

II. FINDINGS OF FACT

1. An application for reservation of water for municipal and other uses was filed by Power-Teton Water and Sewer District. (Bd. Exh. 8-A.)

2. This Applicant failed to appear at the hearing and failed to produce witnesses to testify or defend its application. The Montana Power Company and other objectors had indicated prior to hearing that they would cross-examine witnesses who authored or were familiar with the application. Objectors also presented testimony and exhibits contesting the merits of the application. Power-Teton Water and Sewer District presented no witnesses and the Montana Power Company moved to dismiss the application. (Tr. Day 2, pp. 20, 87-90.)

3. Although the application was admitted into the record as *prima facie* evidence, it is fundamental that objectors have a right to cross-examine the authors or those familiar with the applications. Evidence refuting the applications was also received.

III. ORDER

1. The water reservation application for the Power-Teton Water and Sewer District is denied.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF SHELBY TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Shelby is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 9-A, p. 1; § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Shelby has applied for a water reservation of 302 acre-feet/year (af/yr) of water with a maximum diversion rate of 1.83 cubic feet/second (cfs) to be diverted from alluvial gravel infiltration wells adjacent to the Marias River to be located upstream of the present city infiltration field for year round use. (Bd. Exh. 9-A, pp. 4 and 6.)

3. The City of Shelby requested a water reservation to meet future demands by municipal and industrial users. (Bd. Exh. 9-A, p. 4.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF SHELBY (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Shelby seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 9-A, p.6.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 9-A, p. 4.) Municipal and industrial uses are beneficial uses of water in Montana. (§ 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF SHELBY (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. An existing infiltration field of ten wells presently provides an average of .84 cfs of water to the City of Shelby. (Bd. Exh. 9-C, pp. 1, 3.) The reservation water requested would be delivered from up to 8 new infiltration wells which would pump into the existing municipal water system. (Bd. Exh. 9-C, p. 3.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal and industrial growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 9-A, p. 28.)

8. It is important that the City of Shelby have a water reservation to meet future municipal and industrial water demands in order for the community to prosper and develop. (Bd. Exh. 9-A, p. 27.)

9. Competing water uses may prevent the City of Shelby from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Shelby may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF SHELBY (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Shelby was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of Shelby projected an average annualized (compounded population growth rate) of approximately .74 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Shelby was 2,763. (Bd. Exh. 40, p. 236.) The City of Shelby's population forecast for the year 2025 was 4,387 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that over the past 30 years Shelby's population declined from 4,017 people in 1960 to 2,763 people at present (an annualized population decrease of -1.24 percent). (Bd. Exh. 9-C, p. 7.)

12. The City of Shelby has lower than average leakage levels which are estimated at .14 cfs per day (16 percent of daily use). (Bd. Exh. 9-A, p. 25.) Shelby's average per person usage of 170 gallons per person daily is significantly lower than the typical basin municipal use rate of 250 gallons per person per day. (Bd. Exh. 9-A, pp. 24-25; Bd. Exh. 9-C, p. 3.)

13. One hundred percent of the City water services are metered at present. (Bd. Exh. 9-A, p. 24.) The City of Shelby has one of the lowest rates of per person water use, primarily because of the city's high cost of water. (Bd. Exh. 9-A, p. 25.)

14. The water use efficiencies associated with the municipal and industrial uses by the City of Shelby are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Shelby and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF SHELBY IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Shelby's water reservation were calculated on a willingness-to-pay basis. Shelby used a $1.50 to $3.00/1,000 gallons value. (Bd. Exh. 9-A, p. 46.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $2.32/1,000 gallons. (Bd. Exh. 9-C, p. 5.) This cost is high when compared to other municipal reservation requests (Bd. Exh. 9-C, p. 5.)

18. The direct benefits of the City of Shelby's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Shelby's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 9-A, p. 48.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 9-A, p. 48.)

21. There is no significant adverse environmental impact associated with the use of the City of Shelby's water reservation. (Bd. Exh. 9-C, p. 6.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253 - 254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 9 - A.)

22. Net benefits of granting the City of Shelby's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Shelby identified eight alternative sources of water for future development. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 9-A, p. 44) and are not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of Shelby is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 9-A, pp. 49 and 50; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Shelby's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Shelby will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 9-A; ARM 36.16.107B(5) and (6).)

27. The City of Shelby has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 9-A, p. 51.)

28. The City of Shelby is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Shelby's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

30. As conditioned, the City of Shelby's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Shelby is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Shelby's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Shelby has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Shelby are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) An accurate population projection for the City of Shelby is 3,140 based on a .36 percent annualized growth rate. As modified, the City of Shelby has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Shelby as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Shelby is granted for the following amount and flow of water: .23 cfs and (100 gallons per minute) and 161 af/year.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Shelby and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF CITY OF THREE FORKS CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Three Forks is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 2-A, p. 2; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Three Forks has applied for a water reservation of 81 acre-feet/year (af/yr) of water with a maximum diversion rate of 0.45 cubic feet/second (cfs) to be diverted from two groundwater wells located within the Three Forks city limits for year round use. (Bd. Exh. 2-A, pp. 2 and 27.)

3. The City of Three Forks requested a water reservation to meet future demands by municipal users. (Bd. Exh. 2-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF THREE FORKS (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Three Forks seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 2-A, p. 8.)

5. The purpose of the reservation is to provide the water for municipal uses. (Bd. Exh. 2-A, p. 2.) Municipal uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF THREE FORKS (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. Three groundwater wells presently provide an average of .43 cfs of water to the City of Three Forks. (Bd. Exh. 2-C, p. 2.) The reservation water requested would be delivered through the existing water supply system. (Bd. Exh. 2-A, p. 25.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet projected municipal growth. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 2-A, pp. 6 and 7.)

8. It is important that the City of Three Forks have a water reservation to meet future municipal water demands in order for the community to grow and develop. (Bd. Exh. 2-A, pp. 21 - 23.)

9. Competing water uses may prevent the City of Three Forks from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Three Forks may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF THREE FORKS (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Three Forks was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 2-A, pp. 13 and 14.) The methodology used by the City of Three Forks projected an average annualized (compounded population growth rate) of approximately 0.88 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Three Forks was 1,203. (Bd. Exh. 40, p. 236.) The City of Three Forks' population forecast for the year 2025 was 1,860 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that Three Forks' population had decreased from 1,247 to 1,203 between 1980 and 1990 (Bd. Exh. 40, p. 236) but grew from 1,161 persons in 1960. (Bd. Exh. 2-A, p. 10.) DNRC found that the population projection is reasonable (Bd. Exh. 40, p. 236) with Three Forks' location relative to Bozeman, the potential for growth by annexation, and/or the future potential need of area residents to connect to the city water system due to the arsenic contamination of the Madison River aquifer in the area. (Bd. Exh. 2-C, p. 5.)

12. The City of Three Forks' distribution system is in good condition and does not experience any significant loss in the system. (Bd. Exh. 2-A, p. 20.)

13. Water services in Three Forks are metered at present. (Bd. Exh. 2-A, p. 13.) The City of Three Forks average water use rate is 167 gallons per capita per day (gpcd) without the average 65,500 gallons per day used by the Cyprus Talc plant. (Bd. Exh. 2-A, p. 12.) The 167 gpcd use rate is less than the typical basin use rate of 250 gallons per person daily. (Bd. Exh. 9-A, pp. 24 and 25 .)

14. The water use efficiencies associated with the municipal uses by the City of Three Forks are reasonable. (ARM 36.16.107B(3)(b).)

15. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Three Forks and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF THREE FORKS IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Three Forks' water reservation were calculated on a willingness-to-pay basis. The City of Three Forks used a $1.50/1,000 gallons value. (Bd. Exh. 2-A, p. 19.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $0.45/1,000 gallons. (Bd. Exh. 2-C, p. 4.)

18. The direct benefits of the City of Three Forks' water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Three Forks' reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 2-A, p. 21.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 2-A, p. 21.)

21. There is no significant adverse environmental impact associated with the use of the City of Three Forks' water reservation. (Bd. Exh. 2-C, p. 5.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 2-A.)

22. Net benefits of granting the City of Three Forks' water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Three Forks identified one alternative source of water for future development, surface water. Diversion of surface water would not provide greater net benefits than the water reservation (Bd. Exh. 2-A, p. 20) and are not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal use by the City of Three Forks is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 2-A, p. 22; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Three Forks' water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Three Forks will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 2-A. p. 3; ARM 36.16.107B(5) and (6).)

27. The City of Three Forks has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 2-A, p. 24.)

28. The City of Three Forks is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Three Forks' water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

30. As conditioned, the City of Three Forks' water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Three Forks is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Three Forks' application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Three Forks has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its

reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Three Forks are suitable and accurate under present conditions. (ARM 36.16.107B(3)(a).) As modified, the City of Three Forks has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Three Forks as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Three Forks is granted for the following amount and flow of water: 0.25 cfs and 81 af/year.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Three Forks and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE TOWN OF WEST YELLOWSTONE TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Town of West Yellowstone is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. No.5-A, p. 2; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The Town of West Yellowstone has applied for a water reservation of 2,550 acre-feet/year (af/yr) of water with a maximum diversion rate of 3.52 cubic feet/second (cfs) to be diverted from Whiskey Springs for year round use for an unmetered municipal water system. (Bd. Exh. 5-A, p. 2.) The Town of West Yellowstone further states that it would need 1,922 acre-feet/year with a maximum diversion rate of 2.65 cfs to be diverted from Whiskey Springs for year round use for a metered municipal water system. (Bd. Exh. 5-A, p. 13.)

3. The Town of West Yellowstone requested a water reservation to meet future demands by municipal users. (Bd. Exh. 5-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE TOWN OF WEST YELLOWSTONE (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The Town of West Yellowstone seeks to provide municipal water for existing use and future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 5-A, p. 2.)

5. The purpose of the reservation is to provide the water for municipal uses. (Bd. Exh. 5-A, p. 2.) Municipal uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR THE TOWN OF WEST YELLOWSTONE (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. Whiskey Springs presently provides up to 1,936 acre-feet/year (at a flow rate up to 2.67 cfs) of high quality water to the Town of West Yellowstone. (Bd. Exh. 5-C, p. 6, and West Yellowstone Exh. 2.) The reservation water requested would be

delivered to the present municipal distribution system through an existing 4.3 mile pipeline. (Bd. Exh. 5-C, p. 6.)

7. The Town desires to improve the priority date for its water source. The reservation would run concurrently with any existing water permits. A reservation is the only means to obtain an earlier priority date for water that is presently needed and will be needed to meet projected municipal use (Bd. Exh. 5-A, p. 7.) In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 5-A, pp. 6-9.)

8. It is important that the Town of West Yellowstone have a water reservation to meet present and future municipal water demands for the community. (Bd. Exh. 5-A, p. 19.)

9. Competing water uses may prevent the Town of West Yellowstone from obtaining or perfecting a water use permit in the future. Without a reservation, the Town of West Yellowstone may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE TOWN OF WEST YELLOWSTONE (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the Town of West Yellowstone was based on a forecast of its future population and future tourism to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 5-A, p. 11.) The methodology used by the Town of West Yellowstone projected an average annualized (compounded population growth rate) of approximately 2.0 percent for residents and 1.4 percent for tourists. (Bd. Exh. 5-A, p. 11.) The 1990 population of Town of West Yellowstone was 913. (Bd. Exh. 40, p. 236.) The Town of West Yellowstone's population forecast for the year 2025 was 2,246 people. (Bd. Exh. 40, p. 236.)

11. The resident populations recorded in the 1990 census indicate that the Town of West Yellowstone has grown at 1 percent average annualized rate between 1970 and 1990 (from 756 to 913 people). (Bd. Exh. 5-C, pp. 4 and 7.) A more accurate population projection to the year 2025 would be 1,300 residents based on a 1.0 percent annualized rate. (Bd. Exh. 5-C, p. 4.) Up to 400 additional residents could be added through tourism attractions such as the Grizzly Park development. (Bd. Exh. 5-C, p. 7.)

12. Information from the 1991 summer season indicates that tourism through the West Yellowstone entrance to Yellowstone

National Park has increased at a nearly 3 percent annual rate. (Bd. Exh. 5-C, p. 7.) This is a greater growth rate than the 1.4 percent annualized growth projected by the Town of West Yellowstone. (Bd. Exh. 5-C, p. 7.)

13. The Town of West Yellowstone has recently completed its municipal water system. (West Yellowstone Exh. 1, p. 1.) Because the town water system is newly completed, it is expected to be highly efficient. (West Yellowstone Exh. 12, p. 7.)

14. One hundred percent of the Town of West Yellowstone's water service is metered at present. (West Yellowstone Exh. 12, p. 7.) Approximately 15 percent of the towns residents and businesses remain to be connected to the town water system within a short number of years. Those additional services will be metered. (West Yellowstone Exh. 12, p. 4.)

15. The water use efficiencies associated with the municipal uses by the Town of West Yellowstone are reasonable. (ARM 36.16.107B(3)(b).)

16. No other cost-effective measure could be taken within the reservation term to increase the use efficiency by the Town of West Yellowstone and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE TOWN OF WEST YELLOWSTONE IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

17. Benefits of the Town of West Yellowstone's water reservation were calculated on a willingness-to-pay basis. The Town of West Yellowstone used a $1.50/1,000 gallons value. (Bd. Exh. 5-A, p. 18.) Helena municipal users are currently paying $2.47/1,000 gallons value which . (Bd. Exh. 40, p. 253.)

18. The additional water provided by the water reservation will cost approximately $.43/1,000 gallons. (Bd. Exh. 5-C, p. 9.)

19. The direct benefits of the Town of West Yellowstone's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

20. Indirect benefits of the Town of West Yellowstone's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 5-A, p. 19.)

21. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 5-A, p. 18.)

22. Except for possible fisheries impacts (which are presently protected by a Forest Service .5 cfs bypass flow requirement), there are no expected significant adverse environmental impact associated with the use of the Town of West Yellowstone's water reservation. (Bd. Exh. 5-C, pp. 8-9.) All significant impacts would be mitigated by the attached Specific Reservation conditions. The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 5-A.) No non-quantifiable benefits or costs were identified.

23. Net benefits of granting the Town of West Yellowstone's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

24. The Town of West Yellowstone identified one alternative source of water for future development, the continuing use of wells having elevated fluoride levels (Bd. Exh. 5-A, p. 14.) This alternative would not provide greater net benefits than the water reservation, (West Yellowstone Exh. 12, p. 5) and is not reasonable. (ARM 36.16.107B(4)(c).)

25. Failure to reserve water for future municipal use by the Town of West Yellowstone is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 5-A, p. 20; ARM 36.16.107B(4)(d).)

26. As conditioned, the Town of West Yellowstone's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b)(5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

27. The water reservation by the Town of West Yellowstone will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 5-A; ARM 36.16.107B(5) and (6).)

28. The Town of West Yellowstone has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 5-A, p. 21.)

29. The Town of West Yellowstone is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

30. The priority date of the Town of West Yellowstone's

water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

31. As conditioned, the Town of West Yellowstone's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

32. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. Town of West Yellowstone is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Town of West Yellowstone's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Town of West Yellowstone has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Town of West Yellowstone are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) A more accurate residential population projection for the year 2025 is 1,700 people. As modified, the Town of West Yellowstone has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the Town of West Yellowstone as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Town of West Yellowstone is granted for the following amount and flow of water: 2.65 cfs and 1,922 af/year.

2. The point of diversion and places of use are as set forth in the reservation application Town of West Yellowstone and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Specific Reservation Conditions

A. Compliance with existing and future agency permitting requirements; as directed by state or federal permitting agencies.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE CITY OF WINIFRED TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The City of Winifred is an incorporated municipality and a subdivision of the State of Montana. (Bd. Exh. 6-A, p. 1; Mont. Code Ann. § 85-2-316(1), ARM 36.16.107B(1)(a).)

2. The City of Winifred has applied for a water reservation of 60 acre-feet/year (af/yr) of water with a maximum diversion rate of .26 cubic feet/second (cfs) to be diverted from a well in the alluvial aquifer of the Judith River for year round use. (Bd. Exh. 6-C, p. 1.)

3. The City of Winifred requested a water reservation to meet existing and future demands by municipal and industrial users if water quality problems continue with the existing city water sources. (Bd. Exh. 6-A, p. 3 and Bd. Exh. 6-C, p. 1.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE CITY OF WINIFRED (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The City of Winifred seeks to provide municipal water for future growth in a cost-effective manner. Sound planning requires providing users with an adequate water supply. The term of the water reservation is to year 2025. (Bd. Exh. 6-A, p. 5.)

5. The purpose of the reservation is to provide the water for municipal and industrial uses. (Bd. Exh. 6-A, p. 3.) Municipal and industrial uses are beneficial uses of water in Montana. (Mont. Code Ann. § 85-2-102(2)(a), ARM 36.16.102(3); ARM 36.16.107B(1)(b).)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF WINIFRED (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

6. The "Phillips" well field along Dog Creek presently provides up to .20 cfs of low quality water to the City of Winifred. (Bd. Exh. 6-A, p. 27.) The reservation water requested would be delivered from the Judith River alluvial aquifer to the existing municipal system by a new 9.5 mile pipeline. (Bd. Exh. 6-A, p. 6, and Bd. Exh. 6-C, p. 3A.)

7. A reservation is the only means to obtain an early priority date for water that will be needed to meet possible

municipal needs for better quality water. In the future, water may be appropriated by competing agricultural, industrial, and instream users. (Bd. Exh. 40, p. 249; Bd. Exh. 6-A, p. 6.)

8. It is important that the City of Winifred have a water reservation to meet future municipal and industrial water demands in order for the community have a water supply that meets drinking water quality standards. (Bd. Exh. 6-A, pp. 29-32.)

9. Competing water uses may prevent the City of Winifred from obtaining or perfecting a water use permit in the future. Without a reservation, the City of Winifred may have to go through a costly process of buying or condemning existing water rights to meet increasing demands. (Bd. Exh. 40, p. 249.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE CITY OF WINIFRED (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

10. The method of determining the amount of water requested for a water reservation by the City of Winifred was based on a forecast of its future population to the year 2025 along with the estimated amount of water used per person. (Bd. Exh. 40, p. 35.) The methodology used by the City of Winifred projected an average annualized (compounded population growth rate) of approximately .42 percent. (Bd. Exh. 40, p. 236.) The 1990 population of Winifred was 150. (Bd. Exh. 40, p. 246.) The City of Winifred's population forecast for the year 2025 was 187 people. (Bd. Exh. 40, p. 236.)

11. The populations recorded in the 1990 census indicate that the City of Winifred continues a long term trend of modest population declines. (Bd. Exh. 6-A, p. 12, and Bd. Exh. 40, p. 236.)

12. The City of Winifred's water system appears to operate at a reasonable efficiency (Bd. Exh. 6-A, p. 22), but has elevated use rates of 310 gallons per person per day (about 25% above typical basin use rates of 250 gallons per person per day). (Bd. Exh. 6-A, p. 21.)

13. Over 60 percent of the system services are metered at present. (Bd. Exh. 6-A, p. 21.) However, the meters are unread, with all users billed on a flat rate schedule. (Bd. Exh. 6-A, p. 21.) These low costs encourage excessive water usage. (Bd. Exh. 6-C, p. 2.) Use of meters could be cost-effective in reducing use toward typical use rates of 250 gallons per person (Bd. Exh. 6-A, p. 21.)

14. The water use efficiencies associated with the municipal uses by the City of Winifred are reasonable. (ARM 36.16.107B(3)(b).)

15. Except for the measure listed above, no other cost-effective measure could be taken within the reservation term to increase the use efficiency by the City of Winifred and lessen the amount of water required for the purpose of the reservation. (ARM 36.16.107B(3)(b).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE CITY OF WINIFRED IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

16. Benefits of the City of Winifred's water reservation were calculated on a willingness-to-pay basis. Winifred used a $1.50 to $3.00/1,000 gallons value. (Bd. Exh. 6-A, p. 49.) Helena municipal users are currently paying $2.47/1,000 gallons. (Bd. Exh. 40, p. 253.)

17. The additional water provided by the water reservation will cost approximately $.96 to $1.83/1,000 gallons. (Bd. Exh. 6-A, p. 49; Bd. Exh. 6-C, p. 5.)

18. The direct benefits of the City of Winifred's water reservation exceed the direct costs. (ARM 36.16.107B(4)(a).)

19. Indirect benefits of the City of Winifred's reservation may include secondary economic benefits to the community and to the state, and expanding both the property and income tax base from increased population. (Bd. Exh. 6-A, p. 51.)

20. Indirect costs of the reservation may include loss of opportunity for other development and increased administrative costs. While not quantified these costs are minor. (Bd. Exh. 6-A, p. 50.)

21. There is no significant adverse environmental impact associated with the use of the City of Winifred's water reservation. (Bd. Exh. 6-A, pp. 51-52.) The benefits of better quality municipal drinking water were identified as a significant benefit. (Bd. Exh. 6-A, p. 51.) The effects of individual municipal water reservation depletions on water quality have not been quantified (Bd. Exh. 40, pp. 253-254), but should be very small. Any resulting health risks have not been quantified. No other non-quantifiable benefits or costs were identified. (Bd. Exh. 6-A.)

22. Net benefits of granting the City of Winifred's water reservation exceed the net benefits of not granting the water reservation and the project is economically feasible. (ARM 36.16.107B(4)(b); ARM 36.16.102(9).)

23. The City of Winifred identified two alternative sources of water for future development, a deep well to the Eagle Formation, and water treatment. These alternatives would not provide greater net benefits than the water reservation, (Bd. Exh. 6-A, pp. 37-47) and are not reasonable. (ARM 36.16.107B(4)(c).)

24. Failure to reserve water for future municipal and industrial use by the City of Winifred is likely to result in an irretrievable loss of a resource development opportunity. (Bd. Exh. 6-A, p. 52; ARM 36.16.107B(4)(d).)

25. As conditioned, the City of Winifred's water reservation will have no significant adverse impact to public health, welfare, or safety. (ARM 36.16.107B(4)(e).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

26. The water reservation by the City of Winifred will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 6-A, p. 1; ARM 36.16.107B(5) and (6).)

27. The City of Winifred has identified a management plan for the design, development, and administration of its water reservation. (Bd. Exh. 6-A, p. 54.)

28. The City of Winifred is capable of exercising reasonable diligence towards feasibly financing the project and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

29. The priority date of the City of Winifred's water reservation is July 1, 1985. (Mont. Code Ann. § 85-2-331(4).)

30. As conditioned, the City of Winifred's water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(8).)

31. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by the municipal reservations.

III. CONCLUSIONS OF LAW

1. City of Winifred is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the City of Winifred's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the City of Winifred has been established. Specifically, the City has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the City of Winifred are suitable but not accurate under present conditions. (ARM 36.16.107B(3)(a).) An accurate population projection for the City of Winifred is a stable population of between 120 and 180 people. As modified, the City of Winifred has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Based on a weighing and balancing of the evidence, the reservation by the City of Winifred as modified herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the City of Winifred is granted for the following amount and flow of water: .23 cfs and (100 gallons per minute) and 161 af/year.

2. The point of diversion and place of use are from the well set forth in the reservation application City of Winifred and by reference are made a part of this Order.

3. The reservation is adopted subject to being perfected by December 31, 2025.

4. Relative to other reservations the priority date of the reservation shall be ahead of any other non-municipal reservation granted with a priority date of July 1, 1985. The reservation shall have equal priority with all other reservations granted to all municipalities.

5. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

Application of DHES
Water Reservation Application No. 72582-41I

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a)).

1. The Montana Department of Health and Environmental Sciences (DHES) is an agency of State government. (Mont. Code Ann. § 2-15-104, (1991))

2. Pursuant to Mont. Code Ann. § 85-2-316(1), a state agency is authorized to apply to the Montana Board of Natural Resources and Conservation (Board) to reserve waters for existing or future beneficial uses, or to maintain a minimum flow, level or quality of water throughout the year. (Mont. Code Ann. § 85-2-316; p. 1.)

3. DHES is responsible for administering Montana's water quality laws, including, but not limited to, the Montana Water Quality Act, Mont. Code Ann. § 75-5-101, et seq., and the Montana Public Water Supply Act, Mont. Code Ann. § 75-6-101, et seq.

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY DHES (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. DHES filed an application to reserve one-half (50%) of the average annual flow of the Missouri River to protect water quality. DHES seeks an instream flow reservation of the following amounts at the following locations:

Stream	Amount cfs	Amount Acre-feet/year
Missouri River at Toston	2,596	1,879,504
Missouri River at Ulm	3,204	2,319,696
Missouri River at Virgelle	4,390	3,178,360
Missouri River at Landusky	4,815	3,486,060

(Bd. Exh. 40, p. 33.)

5. Maintenance of a minimum quality of water is a beneficial use. (ARM 36.16.102(3).)

6. The purpose of the DHES reservation request is to assure compliance with Montana's arsenic standards, assure compliance with water quality standards other than arsenic, and to assure compliance with Montana's nondegradation policy as set forth in Mont. Code Ann. §§ 75-5-302 and 75-5-303. (Bd. Exh. 39A, p. 2.)

7. Pursuant to Mont. Code Ann. § 75-5-301, the Board of Health and Environmental Sciences (BHES) has been directed to:

a. establish and modify the classification of all waters in accordance with their present and future beneficial uses;

b. formulate standards of water purity and classification of water according to its most beneficial uses, giving consideration to the economics of waste treatment and prevention. (Bd. Exh. 40, p. 68.)

8. Pursuant to Mont. Code Ann. § 75-5-301, BHES has adopted water quality standards. (Horpestad Dir., pp. 10, 11.) The water quality standards are set forth in the Administrative Rules of Montana (ARM) 16.20.618. (DHES Exh. 8, Horpestad Dir., pp. 10, 11).)

9. Pursuant to Mont. Code Ann. § 75-6-103, BHES has adopted drinking water standards, otherwise referred to as "maximum contaminant levels" (MCL's). (DHES Exh. 8, Horpestad Dir., p. 9.) The drinking water standards (MCL's) are set forth in ARM 16.20.203(1) and ARM 16.20.618(2)(h)(i.) (DHES Exh. 8, Horpestad Dir., p. 9; Bd. Exh. 40, p. 76.)

10. The function of the ambient water quality standard is to prevent increases of pollutants in ambient water which then must be treated. (Tr. Day 14, Horpestad Red., pp. 83, 84.)

11. Pursuant to ARM 16.20.618 the ambient water quality standard for arsenic for the Missouri River is 2.2 nanograms. (DHES Exh. 8, Horpestad Dir., p. 9.)

12. Pursuant to ARM 16.20.203(1) and ARM 16.20.618(2)(h)(i), the drinking water standard ("MCL") for arsenic for the Missouri River is 50 micrograms per liter. (DHES Exh. 8, Horpestad Dir., p. 9.)

13. The water quality standards have been adopted to establish maximum allowable changes in water quality and establish limits for pollutants which affect designated beneficial uses of state waters. (ARM 16.20.615; Mont. Code Ann. § 75-5-301; p. 76.) The water quality standards are composed of water-use classifications, water-use descriptions, specific water-quality criteria and general water-quality criteria. (Mont. Code Ann. § 75-5-301.)

14. A "non-degradation" policy has been established in Mont. Code Ann. § 75-5-303, MCA, which provides that state waters whose quality is higher than the established water quality standards be maintained at that high quality unless it has been affirmatively demonstrated to BHES that a change is justifiable as a result of

necessary economic or social development and will not preclude present and anticipated use of those waters. (Mont. Code Ann. § 75-5-303; DHES Exh. 9, Iverson Dir., pp. 3, 4.)

15. Montana's Water Quality Act requires DHES to protect, maintain, and improve the quality and potability of the Missouri River and its tributaries for public water supplies, wildlife, fish, and aquatic life, agriculture, industry, recreation, and other beneficial uses. (Mont. Code Ann. § 75-5-101(1).)

16. An instream reservation for DHES would benefit public and domestic water supplies by maintaining water quality. (DHES Exh. 9, Iverson Dir., p. 5.)

17. Arsenic, a carcinogen, is a naturally occurring pollutant in the Missouri River Basin. Most of the arsenic comes from geothermal sources in Yellowstone National Park. A lesser contribution of arsenic is made by the Boulder River and other tributaries. (Bd. Exh. 39-A, p. 13.)

18. DHES' instream reservation request will provide flows to dilute arsenic. (DHES Exh. 8, Horpestad Dir., p. 14; Tr. Day 14, p. 84.)

19. A DHES instream reservation would limit further flow depletions, helping to prevent increases in arsenic concentrations in the Missouri River Basin. (DHES Exh. 8, Horpestad Dir., p. 14; Tr. Day 14, p. 84.)

20. Water left instream helps to dilute discharges of acid and toxic metals from operating or abandoned mines. (Bd. Exh. 40, p. 184.)

21. A DHES instream reservation would not change existing water quality but would limit further flow depletions, helping to prevent increases in water temperatures and lower dissolved oxygen levels, especially during low-flow periods. (Bd. Exh. 40, p. 184; Bd. Exh. 41, p. 29.)

22. A DHES instream flow reservation would help maintain the stream's ability to dilute pollutants and to protect holders of wastewater discharge permits from added treatment costs. (Bd. Exh. 40, p. 184; Bd. Exh. 41, p. 30; DHES Exh. 9, Iverson Dir., p. 5.)

23. Those persons relying on Madison and Missouri River waters for drinking water; MPDES permittees, such as municipal and industrial users; agricultural water users; fish and aquatic life; wildlife; and recreationists will all be beneficiaries of DHES' instream reservation request. (DHES Exh. 8, Horpestad Dir., pp. 6, 7; DHES Exh. 9, Iverson Dir., pp. 5, 6; Tr. Day 4, p. 83.)

24. DHES' instream reservation request will also implement the State's non-degradation policy. (DHES Exh. 9, Iverson Dir., pp. 3, 4.)

25. The underlying purpose of DHES' instream reservation request is to protect the public health. (Iverson Dir., p. 5.) Maintenance of minimum quality to protect the public health is a beneficial use of water in Montana. ARM 36.16.102(3)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY DHES (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

26. There is a reasonable likelihood that, in the future, water may be appropriated by competing irrigation, industrial, and other water users in the upper Missouri River basin. (ARM 36.16.107B(2)(a); Bd. Exh. 40, p. 55.)

27. Future competing uses may consume, degrade, or otherwise affect the water available for water. (ARM 36.16.107B(2)(A).)

28. High concentrations of arsenic exist in the Missouri and Madison Rivers. (DHES Exh. 8, Horpestad Dir., p. 7; Atts. DHES-SO8, SO9, and SO10.)

29. These arsenic concentrations far exceed the established instream water quality and drinking water standards applicable to the Missouri and Madison Rivers. (DHES Exh. 8, Horpestad Dir., pp. 7, 9, 10, 11.)

30. The dominant source of arsenic in the Madison River is the geothermal activity in Yellowstone National Park. (DHES Exh. 12, Sonderegger Dir., p. 15; Atts. DHES-SO6 and SO7.)

31. The arsenic present in the Missouri and Madison Rivers originates in Yellowstone National Park, where the mean load is 800 pounds per day from Hebgen to Fort Peck with some increase contributed from the Boulder River. (DHES Exh. 8, Horpestad Dir., p. 7.)

32. There is approximately 800 pounds of arsenic per day at the park boundary and 800 pounds per day in the Madison River near Three Forks. (DHES Exh. 18, Horpestad Reb., p. 3.)

33. At Great Falls, the Missouri River carries 800 pounds per day and the Missouri River carries about 800 pounds of arsenic into Fort Peck reservoir each day. (DHES Exh. 18, Horpestad Reb., p. 3.)

34. Decreasing concentrations of arsenic downstream are due to dilution from better quality tributary water and groundwater. (DHES Exh. 8, Horpestad Dir., p. 7.)

35. Further consumptive uses will raise arsenic concentrations. (Tr. Day 14, p. 84.)

36. Irrigation with Missouri and Madison River water would result in evaporation and water use by plants, thereby concentrating arsenic in return flows which in turn would increase the arsenic concentration in the Missouri River. (Bd. Exh. 40, p. 183.)

37. Future irrigation projects would reduce flows during the summer when some streams are already low due to existing uses and natural conditions. (Bd. Exh. 40, p. 182.)

38. Future irrigation and other depletions in the tributaries would reduce the amount of water to dilute the already high arsenic concentrations in the Madison and Missouri Rivers. (DHES Exh. 8, Horpestad Dir., p. 14.)

39. Increased use of Madison or Missouri River waters for irrigation will result, in some cases, in an increase in the concentration of arsenic in the groundwater. (DHES Exh. 8, Horpestad Dir., p. 14.)

40. A recent study done by Dr. Sonderegger et al. (1989), shows that irrigation of the lower Madison Valley with Madison River water has resulted in arsenic contamination of the alluvial and tertiary aquifers underlying the valley. (Bd. Exh. 40, p. 69.)

41. Madison River water already containing high concentrations of arsenic diverted into irrigation ditch systems and concentrated by evaporation effects, recharges the shallow alluvial aquifer, explaining the increase in arsenic concentration in water from the shallow alluvial aquifer in the downstream direction. (DHES Exh. 12, Sonderegger Dir., Att. DHES-SO2.)

42. Evaporative concentration of river-diverted irrigation water is believed to have been the overwhelming factor in the arsenic contamination of the shallow alluvial aquifer in the Madison Valley floodplain. (DHES Exh. 12, Sonderegger Dir., Att. DHES-SO2.)

43. The cause of elevated arsenic concentrations appears to be related to the land-use pattern of irrigated hayfields in a semiarid environment and to the natural arsenic content of the Madison River water. (DHES Exh. 12, Sonderegger Dir., Att. DHES-SO2.)

44. Irrigating with Madison and Missouri River waters could contaminate shallow aquifers under the projects and might affect downstream wells. (Bd. Exh. 40, p. 183.)

45. Reservoir evaporation accounts for about 58% of the water consumed in the basin. (DHES Exh. 18, Horpestad Reb., p. 4; Bd. Exh. 40, p. 42.)

46. An increase in storage will cause further loss of water and a further increase in average arsenic concentration. (DHES Exh. 18, Horpestad Reb., p. 4.)

47. Many of the tributaries in the Upper Missouri Sub-Basin are polluted by various constituents. (Bd. Exh. 40, pp. 72, 73; Table 4-19, p. 71.)

48. Diversions during low-flow periods generally reduce water quality by decreasing the amount of water available to dilute contaminants. (Bd. Exh. 40, p. 182.)

49. Further depletions could also violate the non-degradation policy and the water quality standards for the constituents listed on Table 4-19, p. 71, of the DEIS. (Tr. Day 14, p. 85.)

50. An instream reservations would not change the existing water quality, but would limit further flow depletions, thereby helping to prevent increases in water temperatures, and lower dissolved oxygen levels, especially during low flow periods. (Bd. Exh. 40, p. 184.)

51. DHES' instream reservation request will provide flows to dilute arsenic. (DHES Exh. 8, Horpestad Dir., p. 14; Tr. Day 14, p. 84.)

52. DHES' instream reservation request will also implement the State's non-degradation policy. (DHES Exh. 9, Iverson Dir., pp. 3, 4.)

53. Future consumption of water by competing water uses are reasonably likely to degrade and otherwise affect water quality. ARM 36.16.107B(2)(a.)

54. DHES is not eligible to apply for a water use permit. (Mont. Code Ann. § 85-2-302.)

55. Water resources values of protecting the public health warrant reserving water. (ARM 36.16.107B(2)(a.)

56. Missouri River water is used as a source of public water supply throughout the basin. (Bd. Exh. 40, p. 183, Table 6-8.)

57. High concentrations of arsenic exist in the Missouri and Madison Rivers. (DHES Exh. 8, Horpestad Dir., p. 7; Atts. DHES-SO8, SO9, and SO10.)

58. These arsenic concentrations far exceed the established instream water quality and drinking water standards applicable to the Missouri and Madison Rivers. (DHES Exh. 8, Horpestad Dir., pp. 7, 9, 10, 11.)

59. The U.S. Environmental Protection Agency's (EPA) conclusions on the health effects of arsenic are contained in its Integrated Risk Management System ("IRIS"). (DHES Exh. 11, Benson Dir., p. 8; Att. DHES-BE1.)

60. Ingested arsenic is a known human carcinogen. (DHES Exh. 11, Benson Dir., p. 9; DHES Exh. 10, Headapohl Dir., p. 7; DHES Exh. 8, Horpestad Dir., p. 8.)

61. Arsenic is considered a Class A carcinogen, which means there is sufficient evidence from human epidemiologic studies to conclude that arsenic causes cancer in humans. (DHES Exh. 10, Headapohl Dir., p. 7; DHES Exh. 11, Benson Dir., p. 11; DHES Exh. 14, Fraser Dir., p. 4; Horpestad Dir., p. 10.)

62. The Taiwanese Study, conducted on over 40,000 persons who ingested arsenic from drinking water, provides the supporting results upon which the EPA bases its conclusion as to the carcinogenity of arsenic. (DHES Exh. 11, Benson Dir., p. 9; Atts. DHES-BE1 and BE2; DHES Exh. 10, Headapohl Dir., p. 7; DHES Exh. 8, Horpestad Dir., p. 10.)

63. The overall prevalence rate for skin cancer in this population was 10.6 per 1,000. (DHES Exh. 11, Benson Dir., p. 9; Att. DHES-BE1.)

64. The incidence of skin cancer in individuals exposed to arsenic for more than 60 years is set forth below:

Arsenic Content of Drinking Water (micrograms per liter)	Incidence of Skin Cancer per 1,000
0-290	27.1
300-590	106.2
600 and above	192.0

(DHES Exh. 11, Benson Dir., p.9)

65. Based on data contained in Finding of Fact 64, the EPA has determined that a concentration of arsenic of 2 micrograms per liter in drinking water corresponds to a 1 in 10,000 lifetime risk. (DHES Exh. 11, Benson Dir., p. 9.)

66. In some places in the Missouri River and its tributaries, arsenic concentrations are approximately 100 micrograms per liter. (DHES Exh. 11, Benson Dir., p. 10.)

67. The EPA and Montana's standard for carcinogens is based on a 1 case per million risk level. (Bd. Exh. 40, p. S-3.)

68. Based on this standard, the risk of skin cancer from arsenic is as high as:

a. 1 case per 77 people at West Yellowstone

b. 1 case per 666 people at Toston

c. 1 case per 10,000 at Landusky. (Bd. Exh. 40, p. S-3.)

69. Downstream, the risks at Fort Peck still exceed 150 cases per million. (DHES Exh. 8, Horpestad Dir., p. 11.)

70. Due to present arsenic concentrations in public water supplies in the Missouri River, the 40 life-time cases already exceed the risk for both the ambient and drinking water standards; and that one additional lifetime case of cancer is unacceptable risk. (Tr. Day 14, p. 88.)

71. The Taiwanese Study also shows that arsenic causes other adverse health effects besides skin cancer, such as:

a. skin lesions;

b. abnormal nerve conduction velocity;

c. Blackfoot Disease.

(DHES Exh. 11, Benson Dir., p. 10; Att. DHES-BE1; DHES Exh. 10, Headapohl, p. 8.)

72. Studies other than the Taiwanese one, show that adverse health effects may occur at doses in the 2-6 micrograms per liter per day range. (DHES Exh. 11, Benson Dir., p. 10; DHES Exh. 10, Headapohl Dir., p. 7.)

73. Based on these data, EPA determined that .8 micrograms per liter/per day was the "no-observed-adverse-effect" level and established a reference dose of .3 micrograms per liter per day. (DHES Exh. 11, Benson Dir., p. 10; DHES Exh. 10, Headapohl Dir., p. 7.)

74. Based on the Taiwanese study and data from Germany and Mexico, this dose-response curve has been corroborated. (DHES Exh. 10, Headapohl Dir., p. 7.)

75. Specific cancer types resulting from high levels of arsenic in drinking water, include squamous cell carcinoma, basal cell carcinoma, situ squamous cell carcinoma, and Type B Keratoses.

(DHES Exh. 10, Headapohl Dir., p. 7.)

76. Other cancers associated with arsenic are leukemia, lymphoma, bladder, angiosarcoma of the liver. (DHES Exh. 10, Headapohl Dir., p. 8.)

77. Eighty percent (80%) of arsenic is absorbed and taken up by red blood cells; and eighty percent (80%) of this amount is distributed in the liver, gastrointestinal tract, bone, skin, hair and nails. (DHES Exh. 10, Headapohl Dir., p. 5.)

78. Acute arsenic poisoning is characterized by abdominal pain and vomiting. (DHES Exh. 10, Headapohl Dir., p. 5.)

79. Doses as low as 130 milligrams (130,000 micrograms) have been fatal. (DHES Exh. 10, Headapohl Dir., p. 6.)

80. Residual peripheral neuropathy (numbness, tingling, pain and burning of the extremities or difficulty walking and exfoliative dermatitis (flaking off of skin) may also occur. (DHES Exh. 10, Headapohl Dir., p. 6; DHES Exh. 11, Benson Dir., p. 10; DHES Exh. 8, Horpestad Dir., p. 8.)

81. A 150-pound person ingesting 2 liters of water per day containing 100 micrograms per liter of arsenic, would receive a dose of approximately 3 micrograms per liter per day; approximately 10 times more than the established reference dose. (DHES Exh. 11, Benson Dir., p. 10.)

82. A 150-pound person would likely demonstrate adverse health effects characteristic of arsenic toxicity from ingesting 2 liters of water per day containing 100 micrograms per liter of arsenic. (DHES Exh. 11, Benson Dir., p. 11.)

83. Montana and EPA's drinking water standard (MCL) for arsenic is 50 micrograms per liter. (DHES Exh. 11, Benson Dir., p. 11; DHES Exh. 14, Fraser Dir., p. 3; DHES Exh. 8, Horpestad Dir., p. 9.)

84. That the EPA and Montana have adopted an ambient water quality standard of 2.2 nanograms (.0022 micrograms) in order to prevent an increase of the arsenic concentration in ambient water. (DHES Exh. 8, Horpestad Dir., p. 9.)

85. 2.2 nanograms corresponds to a 1 in 1,000,000 risk. (DHES Exh. 8, Horpestad Dir., p. 9; DHES Exh. 11, Benson Dir., p. 9.)

86. A revaluation of this criteria has resulted in a revised criteria of 20 nanograms per liter (0.020 micrograms per liter), to be formally published and adopted by EPA and BHES in the near future. (DHES Exh. 8, Horpestad Dir., p. 9.)

87. Since 20 nanograms per liter reflects the most accurate estimate of the actual carcinogenic effects of arsenic, the revised criteria of 20 nanograms per liter was used as the basis of DHES' reservation request. (DHES Exh. 8, Horpestad Dir., p. 10.)

88. Since both 2.2 and 20 nanograms are well below the existing arsenic levels in the Missouri and Madison River systems, (arsenic levels exceed both these concentrations) the use of 20 nanograms has no practical effect on DHES' instream reservation request. (DHES Exh. 8, Horpestad Dir., p. 10.)

89. The 50 micrograms per liter drinking water standard was developed in 1942 by the U.S. Public Health Service, prior to the availability of the Taiwanese data demonstrating that ingested arsenic is a human carcinogen. (DHES Exh. 11, Benson Dir., p. 11.)

90. The EPA intends to lower the drinking water standard (MCL) for arsenic to a range of 2 to 9 micrograms per liter. (DHES Exh. 11, Benson Dir., p. 11; DHES Exh. 14, Fraser Dir., p. 3.)

91. One of EPA's goals in establishing a lowered drinking water standard (MCL) for arsenic is to ensure that the maximum risk from a carcinogenic contaminant falls within the 1 in 10,000 to 1 in 1,000,000 risk range that EPA considers protective of public health; and that exposure to a carcinogenic contaminant is below the established reference dose. (DHES Exh. 11, Benson Dir., p. 12.)

92. When the goals stated in Finding of Fact No. 91, are applied to arsenic, the drinking water standard (MCL) will likely be in the 0.02 to 2 micrograms per liter range. (DHES Exh. 11, Benson Dir., p. 12.)

93. Pursuant to the federal Safe Drinking Water Act, a state having enforcement jurisdiction (or primacy) of that Act, must adopt an MCL at least as stringent as the EPA standard. (DHES Exh. 11, Benson Dir., p. 12.)

94. With a drinking water standard (MCL) for arsenic ranging from 0.02 to 2 micrograms per liter, many public water supplies and groundwater drinking water supplies will become legally unusable without treatment to remove the arsenic. (DHES Exh. 11, Benson Dir., p. 12.)

95. The EPA will also establish a maximum contaminant level goal ("MCLG") for arsenic, as required by § 1412(a)(2) of the federal Clean Water Act. (DHES Exh. 14, Fraser Dir., p. 4; DHES Exh. 8, Horpestad Dir., p. 8.)

96. Since it is assumed that there is no safe threshold for a carcinogen, EPA is considering an MCLG for arsenic as low as zero. (DHES Exh. 14, Fraser Dir., p. 4; DHES Exh. 8, Horpestad Dir., p. 8; Att. DHES-BE3.)

97. MCL's are set as close to MCLG's as feasible considering the availability and performance of treatment technologies; availability, performance and cost of analytical methods; and assessment of costs of applying various treatment technologies. (DHES Exh. 14, Fraser Dir., p. 5; DHES Exh. 11, Benson Dir., p. 11.)

98. The EPA is also considering requiring a "treatment technique approach" (which is the best available technology) rather than a drinking water standard (MCL), where arsenic levels exceed the level established by rule. (DHES Exh. 14, Fraser Dir., p. 5.)

99. Since efficacy of treatment, laboratory and monitoring limitations, and cost of treatment, make it infeasible to limit exposure of arsenic by treatment alone, a reservation of waters ensuring dilution, serves the public health. (DHES Exh. 14, Fraser Dir., p. 6.)

100. Conventional treatment of water supplies does not remove all arsenic from the water. (DHES Exh. 8, Horpestad Dir., p. 11; DHES Exh. 14, Fraser Dir., p. 6.)

101. Even after conventional treatment, significant risks associated with drinking water from the Madison and Missouri Rivers remain. (DHES Exh. 8, Horpestad Dir., p. 11; Att. DHES-HO2.)

102. Individual treatment systems for arsenic removal at the point of use for each household costs approximately $500 and requires about $200 per year for annual maintenance and testing. (DHES Exh. 8, Horpestad Dir., p. 11.)

103. Helena, for example, would expend $1,500,000 initially for arsenic removal and treatment for individual treatment systems, and $600,000, annually for maintenance for arsenic removal at the point of use. (DHES Exh. 8, Horpestad Dir., p. 12.)

104. This treatment would still result in a cancer risk level of about one excess case of cancer in 20,000 exposed persons while conventional treatment would result in one excess case per 2,000 exposed. (DHES Exh. 8, Horpestad Dir., p. 12.)

105. Public water treatment systems such as the ones in Helena and Great Falls, remove approximately one half (½) of the arsenic present while achieving discharge concentrations of about 10 micrograms per liter. (DHES Exh. 8, Horpestad Dir., p. 11; Att. DHES-HO2.)

106. Reverse osmosis treatment for arsenic removal, for an entire public water supply system would be unreasonable since a person ingests approximately one half (½) gallon per day but uses about 100 gallons per day. (DHES Exh. 8, Horpestad Dir., p. 12.)

107. Treatment at the source (at Hebgen) would require a conventional treatment system to treat the average flow of the Madison River at Hebgen (650 million gallons per day) for an initial cost of approximately $325,000,000. (DHES Exh. 8, Horpestad Dir., p. 12.)

108. This conventional treatment could lower arsenic concentrations to about 10 micrograms per liter or a risk level of one in 2,000 at that point. (DHES Exh. 8, Horpestad Dir., p. 13.)

109. A reverse osmosis treatment plant is quite expensive, creates problems of salt and brine disposal, and creates an uninhabitable aquatic environment. (DHES Exh. 8, Horpestad Dir., p. 13.)

110. Dilution would further reduce the risk cited in Finding of Fact No. 68 to about 1 microgram per liter at Helena, or one case in 20,000. (DHES Exh. 8, Horpestad Dir., p. 13.)

111. Increased arsenic concentration in groundwater will result in an increase in the cancer risk for people using that groundwater as drinking water. (DHES Exh. 8, Horpestad Dir., p. 14.)

112. High concentrations of arsenic were found in the valley-fill and tertiary age aquifer near Three Forks. (DHES Exh. 12, Sonderegger Dir., p. 13-14; Att. DHES-SO1, SO4, SO5.)

113. High concentrations of arsenic in the valley-fill aquifer is significant since the drinking water supply for residents of this valley, comes from this aquifer. (DHES Exh. 12, Sonderegger Dir., p. 13; Atts. DHES-SO1 and SO2.)

114. Of 65 wells sampled above Three Forks, over 40 of them recorded arsenic concentrations exceeding the drinking water standard of 50 micrograms per liter, with the maximum values recorded exceeding 150 micrograms per liter. (DHES Exh. 8, Horpestad Dir., p. 14; Atts. DHES-HO2 and SO4.)

115. The increased cancer risk, due to the high concentrations of arsenic in some of the wells, approaches one per 100 people exposed. (DHES Exh. 8, Horpestad Dir., p. 15; Att. DHES-HO2.)

116. There is also evidence that some forms of arsenic concentration accumulate in soils and at some level cause reductions in crop production. (DHES Exh. 8, Horpestad Dir., p. 15.)

117. The EPA has established a zero tolerance level for processed foods for human consumption. (DHES Exh. 8, Horpestad Dir., p. 15; Att. DHES-HO5.)

118. There are numerous Montana Pollutant Discharge Elimination system (MPDES) municipal permittees (43) and industrial permittees (67) in the Missouri and Madison River basins. (DHES Exh. 15, Shewman Dir., p. 4; Atts. DHES-SH1 and SH2.)

119. All point source discharges to surface waters must receive an MPDES permit from the Water Quality Bureau of DHES before they can discharge to surface waters. (DHES Exh. 15, Shewman Dir., p. 4.)

120. Each MPDES permit contains discharge limitations and conditions which ensure that water quality standards will not be violated by the discharge. (DHES Exh. 15, Shewman Dir., p. 3.)

121. A water treatment plant is designed to ensure that permit limits can be achieved at any flow in excess of a specified value ("minimum flow"). (DHES Exh. 15, Shewman Dir., p. 4.)

122. This "minimum flow" is expected to occur for seven (7) consecutive days during any 10-year period, otherwise referred to as the "7Q10." (DHES Exh. 15, Shewman Dir., p. 4.)

123. Flows that exceed the 7Q10 ensure that instream standards and beneficial uses are protected. (DHES Exh. 15, Shewman Dir., p. 5.)

124. Decreased flows cause increased concentrations of various instream constituents. (DHES Exh. 15, Shewman Dir., p. 6.)

125. Long-term decreases in flow resulting from increased consumptive uses will change the 7Q10. (DHES Exh. 15, Shewman Dir., p. 5.)

126. Municipal and industrial MPDES permits contain discharge limits for various constituents (pollutants) that at the 7Q10, will not cause or worsen violations of the ambient water quality standards. (DHES Exh. 15, Shewman Dir., pp. 5, 6.)

127. Increased consumptive uses may lower the 7Q10 and result in restrictive and costly modifications to MPDES permittees. (DHES Exh. 15, Shewman Dir., pp. 5, 6.)

128. At the public hearing held in Bozeman, Montana, on February 20, 1992, Mr. Greg Hester, a Ph.D. candidate at Montana State University with a Masters Degree in agriculture, and an education specialist degree in agriculture, testified that water quality is the top priority issue of Montana State University and National Extension Service. (Tr. Bozeman Public Hearing, p. 84.)

129. Mr. Hester testified that these results were based on two different surveys. (Tr. Bozeman Public Hearing, p. 90.)

130. Mr. Hester stated that the number one issue that people stated was most important to them was water quality. (Tr. Bozeman Public Hearing, p. 84.)

131. Mr. Hester testified that in his opinion it was too risky to pump arsenic all over Montana into a variety of irrigation projects and spread that risk to a lot of aquifers. (Tr. Bozeman Public Hearing, p. 86.)

132. Mr. Hester testified that as to the Final EIS, he could not see how the state could say that the water quality option had no benefit economically when it would reduce disease and the cost of health care, cost of cleanups and litigation. (Tr. Bozeman Public Hearing, p. 87.)

133. Many beneficial uses of Missouri River waters would be protected by DHES' instream reservation request including municipal and other drinking water supplies, municipal, and other water uses, domestic uses, agricultural uses, industrial uses, recreation and aquatic life. (DHES Exh. 9, Iverson Dir., p. 5; DHES Exh. 8, Horpestad Dir., p. 6; Tr. Day 14, p. 82.)

134. Those persons relying on Madison and Missouri River waters for drinking water; MPDES permittees, such as municipal and industrial users; agricultural water users; fish and aquatic life; wildlife; and recreationists will all be beneficiaries of DHES' instream reservation request. (DHES Exh. 8, Horpestad Dir., pp. 6, 7; DHES Exh. 9, Iverson Dir., pp. 5, 6; Tr. Day 4, p. 83.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY DHES (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3)).

135. Mont. Code Ann. § 85-2-316(6), limits the amount of instream flow which the Board can grant to no more than fifty percent (50%) of the average annual flow on gauged streams. (DHES Exh. 8, Horpestad Dir., p. 16.)

136. This statutory limitation itself could double the present arsenic concentrations and cancer risks, even if DHES' reservation is granted. (DHES Exh. 8, Horpestad Dir., p. 16.)

137. DHES has requested fifty percent (50%) of the annual average flow at Toston, Ulm, Virgelle, and Landusky. That the specific reservations applied for are as follows:

Stream	cfs	Amount acre feet/yr
Missouri River at Toston	2,596	1,879,504
Missouri River at Ulm	3,204	2,319,696
Missouri River at Virgelle	4,390	3,178,360
Missouri River at Landusky	4,815	3,486,060

These amounts are based on estimated mean annual streamflow data from 1937-1986 collected from gauges by the United States Geological Survey. (DHES Exh. 8, DHES-HO6 and HO7.)

138. The 50% average annual flow requirement was a limiting factor in the amount of water DHES requested. (Horpestad Dir., Tr. Day 14, p. 95.)

139. If the statute did not limit instream flow applicants to fifty percent (50%) of the average annual flow, DHES would have requested all of the water because of its mandates under the Water Quality Act and Public Water Supply Act. (Tr. Day 14, p. 95.)

140. The annual average flows for many gauged streams already reflects consumptive withdrawals for agricultural, industrial, and municipal uses; arsenic levels therefore already reflect increases due to these withdrawals. (DHES Exh. 8, Horpestad Dir., p. 16; Atts. DHES-HO6 and HO7.)

141. The amount granted does not exceed the statutory limit of fifty percent of the average annual flow. ARM 36.16.107B(3)(c.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY DHES IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

142. The instream reservation request of DHES serves to protect and maintain the water quality in the Missouri River Basin above Fort Peck. (DHES Exh. 9, Iverson Dir., p. 6.)

143. The instream reservation request of DHES serves to protect the public health and the various beneficial uses in the basin. (DHES Exh. 9, Iverson Dir., p. 6.)

144. DHES' instream reservation request will help prevent further degradation of waters in the Missouri River Basin by preventing a further reduction in the dilution capacity by future consumptive uses. (DHES Exh. 9, Iverson Dir., p. 6.)

145. DHES' instream reservation request will help prevent further increases in the concentration of arsenic in the Madison and Missouri Rivers. (DHES Exh. 9, Iverson Dir., p. 6.)

146. Since the ambient water quality for arsenic in the basin is already exceeded in a substantial portion of the basin; and the drinking water standard (MCL) is sometimes exceeded in the input to Canyon Ferry reservoir; it is in the public interest to ensure that the concentration of the carcinogen arsenic do not increase. (DHES Exh. 9, Iverson Dir., p. 7.)

147. DHES' instream reservation request will prevent further arsenic contamination of groundwater from new application of

Missouri River Basin waters to irrigable lands. (DHES Exh. 9, Iverson Dir., p. 7.)

148. DHES' reservation request will help prevent an increase in the risk of cancer to humans from increased levels of arsenic. (DHES Exh. 9, Iverson Dir., p. 7.)

149. DHES' reservation request will serve to help protect the 7Q10 flow upon which all MPDES permit limits and conditions are designed for municipal and industrial dischargers. (DHES Exh. 8, Horpestad Dir., p. 17; DHES Exh. 15, Shewman Dir., p. 6.)

150. The instream reservation request of DHES will help ensure that concentrations of arsenic, and other contaminants in the Missouri River Basin do not increase. (Tr. Day 14, p. 7.)

151. The instream reservation request of DHES will help to assure that the existing violation of the ambient water quality and drinking water standards for arsenic and other contaminants will not be worsened. (Tr. Day 14, p. 7.)

152. The instream reservation request of DHES will serve to help maintain and improve the water quality in the Missouri River Basin above Fort Peck Dam. (Tr. Day 14, p. 6.)

153. DHES' reservation request will serve to help protect, maintain and improve the quality of the Missouri River Basin for public water supplies, agriculture, industry, recreation, wildlife, fish and aquatic life and other beneficial uses. (DHES Exh. 8, Horpestad Dir., p. 17.)

154. The instream reservation request of DHES will conform with requirements of law, specifically, Montana's Water Quality Act and Public Water Supply Act. (Tr. Day 14, p. 7.)

155. DHES' reservation request will contribute to a clean and healthful environment by preventing additional concentrations of the carcinogen arsenic and other contaminants in the Missouri River Basin waters. (DHES Exh. 8, Horpestad Dir., p. 17.)

156. The direct benefit of reserving the requested instream flow is to maintain water quality. The direct costs to DHES would be administrative costs to monitor future permit applications and changes and assess their impact upon the reservation. (Bd. Exh. 39A, p. 28.)

157. The indirect benefits include hydropower, fisheries, and recreation. The indirect costs include transaction costs to other users and foregone future consumption which have not been quantified by the applicant.

158. The benefits of water quality, fisheries, recreation, and hydropower outweigh the direct and indirect cost.

159. There are no reasonable alternatives to the proposed reservation that would have greater net benefits. (DHES Exh. 18, Horpestad Reb., p. 3; DHES Exh. 15, Shewman Dir., pp.5-6; DHES Exh. 1, Melstad Obj., p. 7; ARM 36.16.107B(4)(c.)

160. Failure to grant DHES' water reservation is likely to result in an irretrievable loss of water resources to protect the public health. (ARM 36.16.107B(4)(d).)

161. There are no significant adverse affects to public health, welfare, or safety. ARM 36.16.107B(4)(e.)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8)).

162. The water reservation by DHES will be used wholly within the state and within the Missouri River basin. (Bd. Exh. 1-A; ARM 36.16.107B(5) and (6).)

163. DHES has identified a management plan for the measuring, quantifying, protecting, and reporting of its instream water reservation. (Bd. Exh. 39-A, pp. 69-70.)

164. DHES is capable of exercising reasonable diligence towards measuring, quantifying, protecting, and reporting its instream water reservation in accordance with the management plan. (ARM 36.16.107B(6).)

165. As conditioned, DHES' water reservation will not adversely affect any senior water rights. (ARM 36.16.107B(7).)

166. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by DHES' reservation.

III. CONCLUSIONS OF LAW

1. DHES is a qualified applicant, pursuant to Mont. Code Ann. § 85-2-316.

2. As a state agency, DHES applied to the Board to reserve waters in the Missouri River Basin to maintain a minimum flow and quality of water.

3. The purpose of DHES' reservation is a beneficial use as defined in Mont. Code Ann. § 85-2-102(2), and ARM 36.16.102(3.)

4. The need for DHES' reservation has been established, as required by Mont. Code Ann. § 85-2-316(4)(a)(ii), and ARM 36.16.107B(2)(a) and (b.) Specifically, DHES has demonstrated that there is a reasonable likelihood that future in-state competing water uses would consume, degrade and otherwise affect the water available for the purpose of DHES' reservation and DHES has demonstrated the water resource values warrant reserving water for the requested purpose.

5. The methodologies and assumptions used to determine the requested amount are accurate and suitable. (ARM 36.16.107B(3)(a).) DHES has established the amount of water needed to fulfill its reservation, as required by Mont. Code Ann. § 85-2-316(4)(a)(iii), and ARM 36.16.107B(3)(a) and (c.)

6. Based upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that reservation requested by DHES is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a); ARM 36.16.107B(3).)

7. Upper Missouri River water reservations approved by the board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

8. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

9. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

10. DHES has complied with all the requirements of Mont. Code Ann. § 85-2-316 and ARM 36.16.101 et seq.

11. This reservation does not guarantee minimum flows.

IV. ORDER

1. Based upon the hearing record and subject to all applicable conditions and limitations (including but not limited to the conditions applied to instream reservations in Exhibits A and C attached to this Order) an instream reservation of water in the Missouri River is granted to DHES, for the maintenance of a minimum flow for the purpose of maintaining water quality at the following 4 points, as requested:

STREAM	Amount	
	cfs	Acre-Feet/Year
Missouri River at Toston	2,596	1,879,504
Missouri River at Ulm	3,204	2,319,696
Missouri River at Virgelle	4,390	3,178,360
Missouri River at Landusky	4,815	3,486,060

2. In order to guarantee the quality of Missouri River water for all beneficial uses, the DHES instream flow reservation is granted with priority ahead of other reservations granted except municipalities.

3. The DHES reservation is subject to water rights established prior to July 1, 1985.

4. The DHES instream flow reservation shall run concurrently with any other non-consumptive water rights including but not limited to all hydropower rights and other instream flow reservations.

5. In a proceeding for application for a water use permit or application for a change in appropriation right, the reservation of DHES would not be adversely affected and DHES cannot object if the minimum flow for the purposes of maintaining water quality is not diminished at the 4 points of measure as granted herein.

6. The DHES reservation shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and for any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF DEPARTMENT OF FISH, WILDLIFE AND PARKS TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Montana Department of Fish, Wildlife and Parks (DFWP) is an executive branch agency of the State of Montana established pursuant to Section 2-15-3401, MCA, and is qualified to reserve water pursuant to Section 85-2-316, MCA. (DFWP Exh. 10, Graham Dir., p. 2.)

2. DFWP is the executive branch agency mandated by statute to provide for the protection, preservation and propagation of all fish and wildlife and their habitat within the state. Therefore, DFWP has the responsibility and duty to represent the people of Montana in applying for instream flow reservations for fish, wildlife and their habitat in the Missouri River Basin above Fort Peck Dam.

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY DFWP (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

3. DFWP submitted an application in June 1989 to reserve waters to maintain a minimum flow, level, or quality of water throughout the year or during described portions of the year on 281 stream reaches, one lake, and one swamp in the Missouri River Basin above Fort Peck Dam. (Bd. Exhs. 37-A.1, 37-A.2, and 37-A.3.) The waters applied for, including reach boundaries and amounts of water requested are shown in Table 1. (DFWP Exh. 17, Spence Dir., Appendix A.) By stipulation and agreement between parties, DFWP has agreed to modify the reach boundaries on Mussigbrod Creek, a tributary to the Big Hole River and Blacktail Deer Creek, a tributary to the Beaverhead River. The modified reaches are:

(1) Mussigbrod Creek - From Hellroaring Creek to Arrow Ranch's upper most existing diversion point in NWSENW Section 9,T1S,R16W M.P.M. (Stipulation and Agreement between DFWP and Arrow Ranch Company dated February 10, 1992);

(2) Blacktail Deer Creek - from Middle and West Forks to Zenchiku Land and Livestock's uppermost existing diversion point in SENENE Section 29,T8S,R8W P.M.M. (Stipulation and Agreement between DFWP and Zenchiku Land and Livestock, Inc. dated February 10, 1992.

DFWP Instream flow requests

HEADWATERS SUBBASIN

BIG HOLE RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af/yr)
American Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8	2,027
Big Hole River #1	Warm Springs Creek to Pintlar Creek	Jan 1 - Dec 31	160	115,835
Big Hole River #2	Pintlar Creek to the old Divide Dam	Jan 1 - Dec 31	800	579,173
Big Hole River #3	Old Divide Dam to mouth	Jan 1 - Dec 31	650	470,578
Big Lake Creek	Twin Lakes outlet to mouth	Jan 1 - Dec 31	4.7	3,403
Birch Creek	Mule Creek to mouth	Jan 1 - Dec 31	10	7,240
Bryant Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
California Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Camp Creek	Headwaters to mouth	Jan 1 - Dec 31	5	3,620
Canyon Creek	Canyon Lake to mouth	Jan 1 - Dec 31	5	3,620
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	1	724
Deep Creek	Sevenmile and Tenmile to mouth	Jan 1 - Dec 31	18	13,031
Delano Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Divide Creek	North and East forks to mouth	Jan 1 - Dec 31	3	2,172
Fishtrap Creek	West and Middle forks to mouth	Jan 1 - Dec 31	10	7,240
Francis Creek	Sand Creek to mouth	Jan 1 - Dec 31	4	2,896
French Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Governor Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Jacobsen Creek	Tahepia Lake to mouth	Jan 1 - Dec 31	14	10,136
Jerry Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068
Johnson Creek	Schultz Creek to Forest Service boundary	Jan 1 - Dec 31	13	9,412
Joseph Creek	Anderson Creek to mouth	Jan 1 - Dec 31	5	3,620
LaMarche Creek	West and Middle forks to mouth	Jan 1 - Dec 31	11	7,964
Miner Creek	Upper Miner Lakes to mouth	Jan 1 - Dec 31	9	6,516
Moose Creek	Headwaters to mouth	Jan 1 - Dec 31	9	6,516
Mussigbrod Creek	Hell Roaring Creek to uppermost existing diversion point in NWSENW Section 9 T1S R16W	Jan 1 - Dec 31	10	7,240
NF Big Hole River	Ruby and Trail creeks to mouth	Jan 1 - Dec 31	30	21,719
Oregon Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3	217
Pattengail Creek	Sand Lake to mouth	Jan 1 - Dec 31	12	8,688
Pintlar Creek	Oreamnos Lake to mouth	Jan 1 - Dec 31	10	7,240
Rock Creek	Beaverhead National Forest boundary to mouth	Jan 1 - Dec 31	5	3,620
Ruby Creek	Pioneer and WF Ruby creeks to mouth	Jan 1 - Dec 31	4	2,896
Sevenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.8	1,303
Seymour Creek	Upper Seymour Lake to mouth	Jan 1 - Dec 31	13	9,412
Sixmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
SF Big Hole River	Skinner Lake to mouth	Jan 1 - Dec 31	22	15,927
Steel Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Sullivan Creek	Headwaters to mouth	Jan 1 - Dec 31	4	2,896
Swamp Creek	Yank Swamp to mouth	Jan 1 - Dec 31	8	5,792
Tenmile Creek	Tenmile Lakes to mouth	Jan 1 - Dec 31	3.8	2,751
Trail Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136
Trapper Creek	Trapper Lake to mouth	Jan 1 - Dec 31	3.2	2,317
Twelvemile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.2	869
Warm Springs Creek	West and East forks to mouth	Jan 1 - Dec 31	20	14,479
Willow Creek	Tendoy Lake to mouth	Jan 1 - Dec 31	16	11,583
Wise River	Mono and Jacobson creeks to mouth	Jan 1 - Dec 31	35	25,339
Wyman Creek	Headwaters to mouth	Jan 1 - Dec 31	7	5,068

GALLATIN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTE (cfs)	(af/
Baker Creek	Heeb Lane Bridge to mouth	Jan 1 - Dec 31	14	10,1
Ben Hart Creek	Headwaters to mouth	Jan 1 - Dec 31	29	20,9
Big Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2	1,4
Bridger Creek	Headwaters to mouth	Jan 1 - Dec 31	36.6	26,4
Cache Creek	Headwaters to mouth	Jan 1 - Dec 31	2.6	1,8
EF Hyalite Creek	Heather Lake to Hyalite Reservoir	Jan 1 - Dec 31	7	5,0
East Gallatin River #1	Rocky and Sourdough cks to Bozeman STP outlet	Jan 1 - Dec 31	121.3	87,8
East Gallatin River #2	Bozeman STP outlet to Thompson Spring Creek	Jan 1 - Dec 31	90	65,1
East Gallatin River #3	Thompson Spring Creek to mouth	Jan 1 - Dec 31	170	123,0
Gallatin River #1	Yellowstone NP boundary to WF Gallatin River	Jan 1 - Dec 31	170	123,0
Gallatin River #2	WF Gallatin River to East Gallatin River	Jan 1 - Dec 31	400	289,5
Gallatin River #3	East Gallatin River to mouth	Jan 1 - Dec 31	1,000	723,9
Hell Roaring Creek	NF Hell Roaring Creek to mouth	Jan 1 - Dec 31	16	11,5
Hyalite (Middle) Creek #1	Middle Creek Dam to Middle Creek Ditch intake	Jan 1 - Dec 31	28	20,2
Hyalite (Middle) Creek #2	I-90 bridge near Belgrade to mouth	Jan 1 - Dec 31	16	11,5
MF of the WF Gallatin R.	Headwaters to NF of the WF Gallatin River	Jan 1 - Dec 31	3	2,1
Porcupine Creek	NF Porcupine Creek to mouth	Jan 1 - Dec 31	4.5	3,2
Reese Creek	Bill Smith Creek to mouth	Jan 1 - Dec 31	5	3,6
Rocky Creek	Jackson Creek to Sourdough Creek	Jan 1 - Dec 31	51	36,9
Sourdough (Bozeman) Ck.	Mystic Reservoir to mouth	Jan 1 - Dec 31	35.9	25,9
South Cottonwood Creek	Jim Creek to Hart Ditch headgate	Jan 1 - Dec 31	14	10,1
SF Spanish Creek	Falls Creek to mouth	Jan 1 - Dec 31	15	10,6
SF of the WF Gallatin R.	Headwaters to mouth	Jan 1 - Dec 31	5	3,6
Spanish Creek	North and South forks to mouth	Jan 1 - Dec 31	70	50,6
Squaw Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,6
Taylor Fork	Tumbledown Creek to mouth	Jan 1 - Dec 31	36	26,0
Thompson Spring Creek	County road crossing in T1N R5E Sec 30 to mouth	Jan 1 - Dec 31	29	20,9
WF Gallatin River	Middle and North forks to mouth	Jan 1 - Dec 31	26	18,8
WF Hyalite Creek	Hyalite Lake to Hyalite Reservoir	Jan 1 - Dec 31	12	8,6

JEFFERSON AND BOULDER RIVER DRAINAGES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTE (cfs)	(af
Boulder River #1	West and South forks to High Ore Creek	Jan 1 - Dec 31	20	14,4
Boulder River #2	High Ore Creek to Cold Spring	Jan 1 - Dec 31	24	17,3
Boulder River #3	Cold Spring to mouth	Jan 1 - Dec 31	47	34,0
Halfway Creek	Headwaters to canyon	Jan 1 - Dec 31	1.9	1,3
Hells Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,6
Jefferson River	Headwaters to Madison River	Jan 1 - Dec 31	1,100	796,3
Little Boulder River	Moose Creek to mouth	Jan 1 - Dec 31	7	5,0
North Willow Creek	Hollow Top Lake to mouth	Jan 1 - Dec 31	7	5,0
South Boulder River	Curly Creek to mouth	Jan 1 - Dec 31	12	8,6
South Willow Creek	Granite Lake to mouth	Jan 1 - Dec 31	14	10,1
Whitetail Creek	Whitetail Reservoir to mouth	Jan 1 - Dec 31	3	2,1
Willow Creek	North and South Willow creeks to mouth	Jan 1 - Dec 31	14	10,1
Willow Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	9.2	6,6

MADISON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTE (cfs)	(af/
Antelope Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,1
Beaver Creek	Wyethia Creek to Earthquake Lake	Jan 1 - Dec 31	937	42,2
Black Sand Spring Creek	Black Sand Spring to SF Madison River	Jan 1 - Dec 31	18.7	13,5
Blaine Spring Creek	Ennis National Fish Hatchery to mouth	Jan 1 - Dec 31	23	16,6
Cabin Creek	Gully Creek to Madison River	Jan 1 - Dec 31	585	28,7
Cherry Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,8
Cougar Creek	Yellowstone NP boundary to mouth	Jan 1 - Dec 31	24	17,3

MADISON RIVER DRAINAGE (continued)

Duck Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	23	16,651
Elk River	Headwaters to mouth	Jan 1 - Dec 31	28	20,271
Grayling Creek	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	34	24,615
Hot Springs Creek	North and Middle forks to mouth	Jan 1 - Dec 31	5.5	3,982
Indian Creek	Raw Liver Creek to mouth	Jan 1 - Dec 31	48	34,750
Jack Creek	Lone Creek to mouth	Jan 1 - Dec 31	28	20,271
Madison River #1	Yellowstone NP boundary to Hebgen Reservoir	Jan 1 - Dec 31	500	361,983
Madison River #2	Hebgen Dam to West Fork	Jan 1 - Dec 31	800	579,173
Madison River #3	West Fork to Ennis Reservoir	Jan 1 - Dec 31	1,000	723,967
Madison River #4	Ennis Dam to mouth	Jan 1 - Dec 31	1,300	941,157
Moore Creek	Fletcher Creek to mouth	Jan 1 - Dec 31	1.4	1,014
North Meadow Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
O'Dell Creek	Headwaters to mouth	Jan 1 - Dec 31	98	70,949
Red Canyon Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	2.9	2,100
Ruby Creek	Beartrap Canyon to mouth	Jan 1 - Dec 31	18	13,031
SF Madison River	Dry Canyon to Hebgen Reservoir	Jan 1 - Dec 31	92	66,605
Squaw Creek	North Fork to mouth	Jan 1 - Dec 31	14	10,136
Standard Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240
Trapper Creek	Headwaters to Hebgen Reservoir	Jan 1 - Dec 31	3.2	2,317
Watkins Creek	Coffin Creek to Hebgen Reservoir	Jan 1 - Dec 31	5.5	3,982
WF Madison River	Fox Creek to mouth	Jan 1 - Dec 31	957	66,533

RED ROCK-BEAVERHEAD DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af/yr)
Bear Creek	Headwaters to BLM boundary	Jan 1 - Dec 31	6.5	4,706
Beaverhead River #1	Clark Canyon to East Bench Div Dam at Barretts	Jan 1 - Dec 31	200	144,793
Beaverhead River #2	East Bench Diversion Dam at Barretts to mouth	Jan 1 - Dec 31	200	144,793
Big Sheep Creek	Cabin and Nicholia creeks to mouth	Jan 1 - Dec 31	48	34,750
Black Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810
Blacktail Deer Creek	MF and WF to uppermost existing diversion point in SENENE Section 29 T8S R8W	Jan 1 - Dec 31	42	30,407
Bloody Dick Creek	Swift Lake outlet to mouth	Jan 1 - Dec 31	20	14,479
Browns Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	2.3	1,665
Cabin Creek	Headwaters to mouth	Jan 1 - Dec 31	0.4	290
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344
Deadman Creek	Deadman Lake to mouth	Jan 1 - Dec 31	4.5	3,258
EF Blacktail Deer Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031
EF Clover Creek	Headwaters to mouth	Jan 1 - Dec 31	4.4	3,185
EF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4	1,014
Frying Pan Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6	1,158
Grasshopper Creek	Blue Creek to mouth	Jan 1 - Dec 31	30	21,719
Hell Roaring Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859
Horse Prairie Creek	Headwaters to mouth	Jan 1 - Dec 31	36	26,063
Indian Creek	Headwaters to mouth	Jan 1 - Dec 31	0.2	145
Jones Creek	Headwaters to Lakeview Road crossing	Jan 1 - Dec 31	1.9	1,376
Long Creek	Jones Creek to mouth	Jan 1 - Dec 31	3.4	2,461
Medicine Lodge Creek	Bear Canyon to mouth	Jan 1 - Dec 31	10	7,240
Narrows Creek	Spring in T13S R1E Sec18A to Elk Lake	May 1 - July 15	1.2	869
		July 16 - April 30	0.5	362
Odell Creek	Headwaters to Lower Red Rock Lake	Jan 1 - Dec 31	11	7,964
Peet Creek	Headwaters to reservoir in T14S R4W Sec34A	Jan 1 - Dec 31	0.9	652
Poindexter Slough	Springs & canal T8S R9W Sec3,SW to Beaverhead	Jan 1 - Dec 31	57.9	41,918
Rape Creek	Headwaters to reservoir in T10S R13W Sec4	Jan 1 - Dec 31	0.4	290
Red Rock Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	15	10,859
Red Rock River #1	Dam at Lower Red Rock Lake to Lima Reservoir	Jan 1 - Dec 31	55	39,818
Red Rock River #2	Lima Dam to Clark Canyon Reservoir	Jan 1 - Dec 31	60	43,438
Reservoir Creek	Headwaters to mouth	Jan 1 - Dec 31	1.5	1,086
Shenon Creek	Headwaters to BLM boundary in T10S R14W Sec25	Jan 1 - Dec 31	0.4	290
Simpson Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
Tom Creek	Headwaters to Upper Red Rock Lake	Jan 1 - Dec 31	1.4	1,014
Trapper Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507
WF Blacktail Deer Creek	Grays and South forks to mouth	Jan 1 - Dec 31	3	2,172
WF Dyce Creek	Headwaters to mouth	Jan 1 - Dec 31	0.7	507

RUBY RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af/yr)
Coal Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6	2,606
Cottonwood Creek	Geyser Creek to mouth	Jan 1 - Dec 31	4	2,896
EF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3	2,172
MF Ruby River	Divide Creek to mouth	Jan 1 - Dec 31	5	3,620
Mill Creek	Outlet of Branham Lake to mouth	Jan 1 - Dec 31	10	7,240
NF Greenhorn Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534
Ruby River #1	East, Middle, and West forks to Ruby Reservoir	Jan 1 - Dec 31	102	73,845
Ruby River #2	Ruby Dam to mouth	Jan 1 - Dec 31	40	28,959
Warm Springs Creek	Romy Lake outlet to mouth	Jan 1 - Dec 31	48.5	35,112
WF Ruby River	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172
Wisconsin Creek	Crystal Lake outlet to mouth	Jan 1 - Dec 31	12	8,688

UPPER MISSOURI SUBBASIN

UPPER MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Avalanche Creek	Cooney Gulch to Canyon Ferry Reservoir	Jan 1 - Dec 31	5	3,620	
Beaver Creek	Headwaters in Elkhorn Mts to Canyon Ferry Reservoir	Jan 1 - Dec 31	2.8	2,027	
Beaver Creek	Headwaters in Big Belt Mts to mouth	Jan 1 - Dec 31	10.0	7,240	
Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240	
Confederate Gulch	Debauch Gulch to mouth	Jan 1 - Dec 31	5	3,620	
Cottonwood Creek	Headwaters to mouth	Jan 1 - Dec 31	1.0	724	
Crow Creek	Tizer and Wilson Creeks to Williams Ditch intake	Jan 1 - Dec 31	11	7,964	
Deep Creek	Castle Fork to Missouri River	Jan 1 - Dec 31	9	6,516	
Dry Creek	Headwaters to Broadwater Missouri Canal	Jan 1 - Dec 31	1.8	1,303	
Duck Creek	Headwaters to Canyon Ferry Res.	Jan 1 - Dec 31	8	5,792	
Little Prickly Pear Ck. #1	Canyon Creek to Clark Creek	Jan 1 - Dec 31	22	15,927	15,927
Little Prickly Pear Ck. #2	Clark Creek to mouth	Jan 1 - Dec 31	70	50,678	50,678
Lyons Creek	Headwaters to mouth	Jan 1 - Dec 31	10.0	7,240	7,240
McGuire Creek	Headwaters to mouth	May 1 - Nov 30	8.3	3,523	
		Dec 1 - Apr 30	4.7	1,408	4,931
Missouri River #1	Jefferson and Madison rivers to Canyon Ferry Res.	Jan 1 - Dec 31	2,400	1,737,520	1,737,520
Missouri River #2	Hauser Dam to Holter Reservoir	Oct 15 - Dec 15	4,878	599,873	
		Dec 16 - Mar 15	3,000	535,537	
		Mar 16 - Apr 30	5,316	485,030	
		May 1 - June 30	7,890	954,624	
		July 1 - Oct 14	3,500	735,867	3,310,931
Missouri River #3	Holter Dam to Great Falls	May 19 - July 5	6,398	609,132	
		July 6 - May 18	4,100	2,577,916	3,187,048
Prickly Pear Creek #1	Rabbit Gulch to Hwy 12 bridge in East Helena	Jan 1 - Dec 31	22	15,927	15,927
Prickly Pear Creek #2	Hwy 12 bridge in East Helena to Lake Helena	Jan 1 - Dec 31	30	21,719	21,719
Sevenmile Creek	Greenhorn Creek and Skelly Gulch to mouth	Jan 1 - Dec 31	1.0	724	724
Sheep Creek	Headwaters to mouth	Jan 1 - Dec 31	35	25,339	25,339
Silver Creek	Helena Valley Irrigation Canal to mouth	May 1 - Nov 30	13.0	5,518	
		Dec 1 - Apr 30	5.4	1,617	7,135
Sixteenmile Creek	Billy Creek to mouth	Jan 1 - Dec 31	20	14,479	14,479
Spokane Creek	Helena Valley Irr. Canal to mouth	May 1 - Nov 30	4.0	1,698	
		Dec 1 - Apr 30	3.0	898	2,596
Stickney Creek	North and South forks to mouth	Apr 1 - Apr 30	7	417	
		May 1 - May 31	34	2,091	
		June 1 - June 30	35	2,083	
		July 1 - July 31	7	430	5,021
Tenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	12.0	8,688	8,688
Trout Creek	Springs near Vigilante Campground to mouth	Jan 1 - Dec 31	15.0	10,860	10,860
Virginia Creek	Headwaters to mouth	Jan 1 - Dec 31	6.0	4,344	4,344
Wegner Creek	Headwaters to mouth	Apr 1 - Apr 30	8	476	
		May 1 - May 31	41	2,521	
		June 1 - June 30	38	2,261	
		July 1 - July 31	8	492	5,750
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5	2,534	2,534
Wolf Creek	Headwaters to mouth	Jan 1 - Dec 31	7.0	5,068	5,068

DEARBORN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	110	79,636	79,636
Flat Creek	Headwaters to mouth	Jan 1 - Dec 31	7.5	5,430	5,430
MF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
SF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	11.5	8,326	8,326

SMITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Big Birch Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Eagle Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5	1,810	1,810
Hound Creek	EF Hound Creek and Middle Creek to mouth	Jan 1 - Dec 31	35	25,339	25,339
Newlan Creek	Headwaters to mouth	Jan 1 - Dec 31	3.8	2,751	2,751
NF Deep Creek	Headwaters to rock cascades	Jan 1 - Dec 31	1.0	724	724
NF Smith River	Headwaters to mouth	Jan 1 - Dec 31	9	6,516	6,516
Rock Creek	Headwaters to mouth	Jan 1 - Dec 31	11	7,964	7,964
Sheep Creek	Headwaters of South Fork to mouth	Jan 1 - Dec 31	22	15,927	15,927
Smith River #1	North and South Forks Sheep Creek	Jan 1 - Dec 31	90	65,157	65,157
Smith River #2	Sheep Creek to Hound Creek	Jan 1 - Dec 31	150	108,595	108,595
Smith River #3	Hound Creek to mouth	Jan 1 - Dec 31	80	57,917	57,917
SF Smith River	Headwaters to mouth	Jan 1 - Dec 31	7	5,068	5,068
Tenderfoot Creek	Headwaters to mouth	Jan 1 - Dec 31	15	10,859	10,859

SUN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Elk Creek	Headwaters to mouth	Jan 1 - Dec 31	16	11,583	11,583
Ford Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
NF Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.0	2,172	2,172
Sun River #1	Diversion Dam to Elk Creek	Jan 1 - Dec 31	100	72,397	72,397
Sun River #2	Elk Creek to mouth	Jan 1 - Dec 31	130	94,116	94,116
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3	2,172	2,172

BELT CREEK DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Belt Creek #1	Headwaters to Big Otter Creek	Jan 1 - Dec 31	90	65,157	65,157
Belt Creek #2	Big Otter Creek to Missouri River	Jan 1 - Dec 31	35	25,339	25,339
Big Otter Creek	Whiskey Spring Coulee to Belt Creek	Jan 1 - Dec 31	5	3,620	3,620
Dry Fork Belt Creek	Galena and Oti Park Creek to Belt Creek	Jan 1 - Dec 31	7	5,068	5,068
Logging Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	6	4,344	4,344
Pilgrim Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	8	5,792	5,792
Tillinghast Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	5.5	3,982	3,982

MIDDLE MISSOURI SUBBASIN

MIDDLE MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Cow Creek	NF and SF to County bridge	Jan 1 - Dec 31	4.5	3,258	3,258
Highwood Creek	Headwaters to Hwy 228 Bridge at Highwood	Jan 1 - Dec 31	10	7,240	7,240
Missouri River #4	Great Falls to Maris River	Mar 15 - May 18	4,887	630,059	
		May 19 - July 5	11,284	1,074,311	
		July 6 - Aug 31	4,500	508,760	
		Sep 1 - Mar 14	3,700	1,431,075	3,644,205
Missouri River #5	Marias River to Judith River	Mar 15 - May 18	5,571	718,244	
		May 19 - July 5	14,000	1,332,892	
		July 6 - Aug 31	5,400	610,512	
		Sep 1 - Mar 14	4,300	1,663,140	4,324,788
Missouri River #6	Judith River to upper end of Fort Peck Reservoir	Mar 15 - May 18	7,100	915,371	
		May 19 - July 5	15,302	1,456,851	
		July 6 - Aug 31	5,800	655,735	
		Sep 1 - Mar 14	4,700	1,817,850	4,845,807
Shonkin Creek	Forest boundary to town of Shonkin	Jan 1 - Dec 31	7	5,068	5,068

FORT PECK RESERVOIR TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Big Dry Creek	Hwy 200 bridge to mouth	Mar 15 - Mar 31	300	9,521	
		Apr 1 - Apr 30	100	5,950	
		May 1 - May 31	35	2,152	
		June 1 - Oct 31	5.5	1,669	19,292
Little Dry Creek	Whiteside ranch house to Big Dry Creek	Mar 15 - Mar 31	110	3,491	
		Apr 1 - Apr 30	42	2,499	
		May 1 - May 31	17	1,045	
		June 1 - Oct 31	3.5	1,062	8,097

JUDITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Beaver Creek	West Fork to Cottonwood Creek	Jan 1 - Dec 31	5	3,620	3,620
Big Spring Creek #1	Fish hatchery to Cottonwood Creek	Jan 1 - Dec 31	110	79,636	79,636
Big Spring Creek #2	Cottonwood Creek to mouth	Jan 1 - Dec 31	100	72,397	72,397
Cottonwood Creek	Spring Branch of Cottonwood Ck. to Big Spring Ck.	Jan 1 - Dec 31	4.5	3,258	3,258
East Fork Big Spring Ck.	Headwaters to Big Spring Creek	Jan 1 - Dec 31	7.5	5,430	5,430
Judith River #1	SF and MF to Big Spring Creek	Jan 1 - Dec 31	25	18,099	18,099
Judith River #2	Big Spring Creek to Missouri River	Jan 1 - Dec 31	160	115,835	115,835
Lost Fork Judith River	SF and WF to MF Judith River	Jan 1 - Dec 31	14	10,136	10,136
Middle Fork Judith River	Headwaters to South Fork	Jan 1 - Dec 31	22	15,928	15,928
South Fork Judith River	Headwaters to Middle Fork	Jan 1 - Dec 31	3.5	2,534	2,534
Warm Spring Creek	Springs to Judith River	Jan 1 - Dec 31	110	79,636	79,636
Yogo Creek	Headwaters to MF Judith River	Jan 1 - Dec 31	3	2,172	2,172

MUSSELSHELL RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Alabaugh Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
American Fork Creek	South Fork to mouth	Jan 1 - Dec 31	5.5	3,982	3,982
Big Elk Creek	Origin at Lebo Fork to mouth	Jan 1 - Dec 31	9.5	6,878	6,878
Careless Creek	Headwaters to Roberts Creek	Jan 1 - Dec 31	2	1,448	1,448
Checkerboard Creek	East and West Forks to mouth	Jan 1 - Dec 31	6	4,344	4,344
Collar Gulch Creek	Headwaters to mouth	Jan 1 - Dec 31	0.6	434	434
Cottonwood Creek	WF, MF, and Loco Creek to mouth	Jan 1 - Dec 31	16	11,583	11,583
Flatwillow Creek	NF and SF to Petrolia Reservoir	Jan 1 - Dec 31	18	13,031	13,031
Musselshell River #1	NF and SF to Deadmans Basin Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #2	Deadmans Basin Div to Musselshell Div	Jan 1 - Dec 31	80	57,917	57,917
Musselshell River #3	Musselshell Diversion Dam at town of Musselshell to mouth	Jan 1 - Dec 31	70	50,678	50,678
NF Musselshell #1	Headwaters to Bair Reservoir	Jan 1 - Dec 31	3	2,172	2,172
NF Musselshell #2	Bair Reservoir to SF Musselshell R.	Jan 1 - Dec 31	16	11,583	11,583
SF Musselshell	Headwaters to North Fork	Jan 1 - Dec 31	30	21,719	21,719
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	8	5,792	5,792
Swimming Woman Ck.	Headwaters to Cty road crossing 8 linear miles upstream from mouth	Jan 1 - Dec 31	2.5	1,810	1,810

MARIAS/TETON SUBBASIN

MARIAS RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Badger Creek	N and S Badger creeks to Forest/ Blackfeet Reservation Boundary	Jan 1 - Dec 31	60	43,438	43,438
Birch Creek	Swift Reservoir to Hwy 358	Jan 1 - Dec 31	64	46,334	46,334
Cut Bank Creek	Blackfeet Reservation boundary to mouth	Jan 1 - Dec 31	75	54,297	54,297
Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
Marias River #1	Two Medicine River and Cut Bank Creek to head of Tiber Reservoir	Jan 1 - Dec 31	200	144,793	144,793
Marias River #2	Tiber Dam to Circle Bridge (Hwy 223)	Jan 1 - Dec 31	500	361,983	361,983
Marias River #3	Circle Bridge (Hwy 223) to mouth	Jan 1 - Dec 31	560	405,421	405,421
North Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	14	10,136	10,136
NF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12	8,688	8,688
South Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	40	28,959	28,959
SF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	6	4,344	4,344
SF Two Medicine River	Headwaters to Forest/ Blackfeet Reservation Boundary	Jan 1 - Dec 31	16	11,583	11,583

TETON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	18	13,031	13,031
McDonald Creek	Headwaters to mouth	Jan 1 - Dec 31	10	7,240	7,240
NF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	7.2	5,212	5,212
SF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	6.9	4,995	4,995
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	4.5	3,258	3,258
Teton River	Headwaters to discharge from Priest Butte Lake	Jan 1 - Dec 31	35	25,339	25,339

LAKES AND SWAMPS

STREAM	REACH DESCRIPTION	DATES REQUESTED	AMOUNT REQUESTED (cfs)	(af)	(af/yr)
Bean Lake	Sec. 18C and 19B, T18N, R6W, Sec. 13D and 24A, T18N, R7W	Jan 1 - Dec 31	—	2,649	2,649
Antelope Butte Swamp	North 1/2 Sec. 28, T26N, R8W	Jan 1 - Dec 31	—	460	460

4. The instream reservations are for the benefit of the public for fish, wildlife and recreational uses. (Bd. Exh. 37-A.1, p. 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17, Spence Dir., pp. 4 and 5.)

5. A purpose of the reservations is to preserve the riparian habitats of fish and wildlife populations at the present levels by protecting the quantity and quality of the water. (Bd. Exh. 37-A.1, pp. 1-2 and 1-5; DFWP Exh. 10, Graham Dir., pp. 2 and 3; DFWP Exh. 17, Spence Dir., pp. 4 thru 6.)

6. By preserving the fish and wildlife habitats, the instream reservations will protect the diversity of fish and wildlife species comprising the riparian natural resource in the Missouri River Basin above Fort Peck Dam. Fish and wildlife populations and their habitats are inseparable. (Bd. Exh. 37-A.1, pp. 1-2 and 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17, Spence Dir., pp. 4 and 5.)

7. A purpose of the instream reservations is to contribute to, and maintain, a clean, healthful and desirable environment and to protect the environmental life support systems of the stream and river systems from degradation. (Bd. Exh. 37-A.1, pp. 1-2 thru 1-5; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17, Spence Dir., pp. 4 thru 6.)

8. A purpose of the reservations is to help maintain water quality. (Bd. Exh. 37-A.1, pp. 1-3 and 1-5; DFWP Exh. 10, Graham Dir., pp. 7 and 8.)

9. A purpose of the reservations is to provide optimum opportunities for diverse outdoor recreation that are commensurate with the resource protection provided by instream reservations, including simply enjoying or knowing of the existence of a healthy ecosystem. (Bd. Exh. 37-A.1, pp. 1-3 thru 1-5; DFWP Exh. 17, Spence Dir., pp. 4 and 5.)

10. A purpose of the reservations is to help sustain adequate levels of water quality to protect fish and wildlife habitat. (Bd. 37-A.1, p. 1-5; DFWP Exh. 10, Graham Dir., pp. 2,3,7,and 11; DFWP Exh. 17, Spence Dir., pp. 5 and 6.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY DFWP (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

11. An instream flow for fish, wildlife, and recreational purposes cannot be obtained through a water use permit. (Bd. Exh. 40, p. 22; Bd. Exh. 37-A.1, p. 1-6; DFWP Exh. 17, Spence Dir., p. 5.)

12. The temporary water leasing statutes (Sections 85-2-436 and 437, MCA) provide for the temporary leasing of consumptive water rights for instream purposes to supplement existing flows, but do not allocate unused water and do not provide an opportunity to preserve the status quo where fisheries values are significant, as reservations would. Water leases are applicable to specific problem areas where the considerable cost of leasing water is justified. (DFWP Exh. 10, Graham Dir., p. 4; DFWP Exh. 17, Spence Dir., p. 5.)

13. Based on past experience, stream flows will continue to be depleted, increasing the annual occurrence of critically low flows if minimum instream flows are not protected. (Bd. Exh. 40, Appendix A; Bd. Exh. 37-A.1, pp. 1-6; DFWP Exh. 10, Graham Dir., p. 11.)

14. Instream flows of water in the Missouri basin are needed to meet the basic life requirements of the fish, wildlife, and other living organisms that are dependent upon the flow of the Missouri River and its tributaries. (Bd. Exh. 37-A.1, p. 1-6; DFWP Exh. 10, Graham Dir., p. 10; DFWP Exh. 17, Spence Dir., pp. 4 and 5.)

15. Sufficient instream flows are essential for maintaining viable fish populations at levels commensurate with the stream's biological capabilities. Flow primarily regulates fish abundance through its impact on fish habitat. Fish inhabiting a stream occupy specific habitats which are comprised of many components, which are all created by sufficient stream flows. (Bd. Exh. 37-A.1, pp. 1-6 and 1-7; DFWP Exh. 17, Spence Dir., pp 5.)

16. Instream flows will help preserve the reproductive capacity of streams and rivers for fish. Stream riffles and side channels are typically the prime sites chosen for spawning and the rearing of young. These sites are also the stream habitats that are most sensitive to flow reductions. Consequently, the production of the young recruits that are needed to sustain stream fisheries is strongly tied to the magnitude of the flows necessary to maintain riffle and side channel habitat. (Bd. Exh. 37-A.1, pp. 1-7; DFWP Exh. 17, Spence Dir., p. 5.)

17. Instream flows are necessary to protect the food base for fish. All aquatic organisms, including game fish, depend on some lower form of plant or animal for food. These lower life forms have specific water requirements necessary to sustain their growth and reproduction. The primary food of Montana stream-dwelling gamefish is aquatic invertebrates which have their greatest production in stream riffles. Riffles are highly sensitive to stream flow reductions. Therefore, the health and well being of game fish populations and, in turn, the quality of the angling experience depend on the maintenance of sufficient riffle habitat

to protect the fishes food base. (Bd. Exh. 37-A.1, p. 1-7; DFWP Exh. 10, Graham Dir., p. 2; DFWP Exh. 17, Spence Dir., pp. 5 and 6.)

18. Instream flows will help protect the quality of water that is necessary to sustain aquatic organisms and will help prevent the further deterioration of water quality during low flow periods. Possible consequences of further lowering streamflows during normal low flow periods are higher water temperatures, increased amounts of dissolved solids, increased nutrient concentrations and lower dissolved oxygen levels, all of which are potentially harmful to aquatic life. (Bd. Exh. 37-A.1, pp. 1-7 and 1-8; DFWP Exh. 10, Graham Dir., pp. 2,7 and 8; DFWP Exh. 17, Spence, p. 6.)

19. Instream flows will help preserve the Missouri River and its tributaries as important fishing and recreational areas used by the people of Montana and other states. Approximately one-half of the fishing pressure which occurs in the entire state occurs in the Missouri River basin upstream from Fort Peck Dam. The area is popular for its recreational opportunities and portions of the basin's fisheries values are of outstanding quality. Recreational use of the Missouri basin's water is important to the human experience, providing both enjoyment and relief from day-to-day pressures. (Bd. Exh. 37-A.1, p. 1-8; DFWP Exh. 10, Graham Dir., p. 10; DFWP Exh. 17, Spence Dir., p. 4; DFWP Exh. 37, Knudson Dir., pp. 3 - 8.)

20. Conservation of native fish species by sustaining their habitat reduces the potential for the species to become listed as threatened and endangered. (DFWP Exh. 10, Graham Dir., p. 10.)

21. Instream flows will help preserve the Missouri basin's nationally acclaimed sport fisheries which provide a significant part of Montana's economy. In 1989, Montana ranked fifth in the nation in the number of nonresident fishing licenses sold. Trout anglers spent about $50 million in 1985 fishing the waters of the Missouri River Basin above Fort Peck Dam. The net economic value of fishing alone in the basin was over $61.5 million in 1985. The total economic value of streams in the basin would be significantly higher than the amount for fishing alone if other recreational benefits were included, such as floating, camping, picnicking, swimming, bird watching, sightseeing and hunting. These are all popular recreational activities conducted along the Missouri River and its tributaries. (Bd. Exh. 37-A.1, pp. I-9 and I-10; DFWP Exh. 10, Graham Dir., pp. 10 and 11.)

22. The travel industry adds millions of dollars to the state's economy each year and provides jobs for thousands of Montanans. Without the quality fishing opportunities provided by the Missouri River basin, Montana's tourist industry, a major contributor to the state's economy, would suffer. Angling-related

revenues depend on the maintenance of sufficient flows to protect the abundant fish resources that characterize Montana. Continued flow depletions will degrade some of the very resources that draw tourists to Montana. (Bd. Exh. 37-A.1, pp. I-9 and I-10; DFWP Exh. 10, Graham Dir., p. 10.)

23. Instream flows are needed to preserve a flow for instream values by protecting the status quo of stream and river flows up to the minimum flows necessary to provide a healthy fishery.

24. On the following guaged streams DFWP applied for an instream reservation that exceeds one-half or 50% of the average annual flow. The one-half annual flow is applied to the following streams or reaches. (Bd. Exh. 40, DEIS, pp. 135-152 and Bd. Exh. 40, FEIS, p 58.)

Stream or Reach	50% Annual Flow (cfs)
Gallatin River Drainage	
Gallatin River #3	533.5
Madison River Drainage	
Jack Creek	24.0
Madison River #1	245.0
Madison River #2	502.5
Madison River #3	716.0
Madison River #4	825.0
Jefferson River Drainage	
Jefferson River	1,095.5
Big Hole River Drainage	
Big Hole River #3	573.0
Ruby River Drainage	
Ruby River #1	90.0
Red Rock-Beaverhead River Drainages	
Big Sheep Creek	32.5
Blacktail Deer Creek	27.0
Grasshopper Creek	25.8
Upper Missouri River Drainage	
Missouri River #2	2,881.0
Tenmile Creek	12.0
Middle Missouri River & Tributaries	
Missouri River #3	3,327.0
Smith River Drainage	
Smith River #1	78.5

Marias River Drainage	
Marias River #2	419.5
Marias River #3	488.5
Middle Missouri River & Tributaries	
Missouri River #4	3,876.0
Missouri River #5	4,280.0
Missouri River #6	4,652.0
Judith River Drainage	
Big Spring Creek #1	53.5
Flatwillow Creek	15.0

25. About 2,739 streams in the Missouri River Basin above Fort Peck Dam support a fishery or have the potential for a fishery. The streams in DFWP's application include those with the more significant fishery values in the basin. (DFWP Exh. 17, Spence Dir., p. 13; Nelson Cross, Tr. Day 4, pp. 37 and 38.)

26. The Gallatin River is nationally recognized for its outstanding wild trout fishery. In 1989, the river supported over 65,000 angler-days of use. (DFWP Exh. 22, Nelson Dir., p. 25.)

27. Reach #1 of the Gallatin River, from the Yellowstone National Park boundary to the confluence of the West Fork Gallatin River, supports an abundance of pan-sized rainbow trout in the 7-10 inch class and a few brown trout up to 18 inches. (Bd. Exh. 37-A.2, p. 2-481.)

28. Rainbow trout from 10-14 inches and brown trout in the 12-17 inch class are the mainstay of the fishery in Reach #2 of the Gallatin River (from the confluence of the West Fork Gallatin River to the confluence of the East Gallatin River). (Bd. Exh. 37-A.2, p. 2-484.)

29. Reach #3 of the Gallatin River, from the confluence of the East Gallatin River to the river's mouth, is noted for the presence of larger-size brown and rainbow trout, some reaching trophy proportions. (DFWP Exh. 22, Nelson Dir., pp. 25 and 26.)

30. Cache, Hell Roaring, Porcupine, S.F. Spanish, Spanish, and Squaw Creeks, the Taylor Fork, and the West Fork Gallatin River and its Middle and South forks drain the high peaks of the Gallatin National Forest and feed the canyon stretch of the Gallatin River. These are the most important stream fisheries in the Gallatin Canyon. Rainbow trout are the most abundant species in eight streams, brook trout dominate in one (S.F. Spanish Creek), while genetically impure cutthroat trout are most numerous in Cache Creek. (DFWP Exh. 22, Nelson Dir., p. 26.) As to the Middle Fork of the West Fork of the Gallatin River when compared with similar streams its trout population is only fair. (Bd. Exh. 37-A.2, p. 2-501.) As to the South Fork of the West Fork of the Gallatin River

electro-fishing results show fewer fish than other similar streams. (Bd. Exh. 37-A.2, p. 2-504.)

31. South Cottonwood and Big Bear creeks support rainbow, brook and a few cutthroat trout in their mountain headwaters in the Gallatin National Forest. Upper South Cottonwood Creek is one of the Gallatin's outstanding small stream fisheries. (DFWP Exh. 22, Nelson Dir., p. 26.) However, the fishery of Big Bear Creek is substantially lower than expected for a mountain stream of its size. (Bd. Exh. 37-A.2, p. 2-526 and Table 2-151.)

32. Baker Creek has spring creek-like qualities. High numbers of larger-size brown trout inhabit the lower creek. During the fall, brown trout from the Gallatin River enter the creek to spawn. (DFWP Exh. 22, Nelson Dir., p. 26.)

33. The East Gallatin River supports robust populations of rainbow and brown trout despite its proximity to the growing urban center of Bozeman. Recent upgrades in Bozeman's sewage treatment plant have allowed the East Gallatin fishery to improve. However, water quality problems persist. (DFWP Exh. 22, Nelson Dir., p. 26.)

34. Reach #1 of the East Gallatin River, from the convergence of Rocky and Sourdough creeks to the Bozeman Sewage Treatment Plant outlet, supports substantial numbers of rainbow trout, which occasionally reach weights of 3-5 pounds, and 1-2 pound brown trout, with an occasional trophy of up to 8-9 pounds. Fish populations are subject to periodic fluctuations, a probable consequence of water quality problems. (Bd. Exh. 37-A.2, pp. 2-570 through 2-572.)

35. Reach #2 of the East Gallatin River, from the Bozeman Sewage Treatment plant outlet to the confluence of Thompson Creek, presently supports substantial numbers of brown and rainbow trout for a river of its size. Rainbow trout as large as 5 pounds are present while brown trout typically reach weights of 2 pounds. Fish populations are subject to periodic fluctuations, a probable consequence of water quality problems. (Bd. Exh. 37-A.2, pp. 2-573 through 2-575.)

36. The trout fishery of Reach #3 of the East Gallatin River (from the confluence of Thompson Creek to the River's mouth), while not the caliber of that in Reaches #1 and #2, is popular with local anglers. Brown trout predominate, followed by rainbow trout and a few brook trout. (Bd. Exh. 37-A.2, p. 2-577.)

37. Sourdough (Bozeman), Rocky and Bridger creeks are, in their own right, notable stream trout fisheries. (Bd. Exh. 37-A.2, pp. 2-536 through 2-546; Nelson Cross, Tr. Day 1, pp. 155 and 156.)

38. The East and West forks of Hyalite Creek, both within the boundaries of the Gallatin National Forest, provide crucial spawning and rearing habitats for the cutthroat and arctic grayling populations in Hyalite Reservoir. (DFWP Exh. 22, Nelson Dir., p. 26.)

39. Ben Hart, Thompson and Reese creeks are spring-fed creeks that are highly valued for their outstanding fisheries for rainbow and brown trout. (DFWP Exh. 22, Nelson Dir., p. 26.)

40. Reach #1 of Hyalite Creek (from Middle Creek Dam to the Middle Creek Ditch intake) supports an abundance of small rainbow trout, making it one of the more valued tributaries in the Gallatin drainage. (Bd. Exh. 37-A.2, p. 2-555.)

41. Reach #2 of Hyalite Creek (from the I-90 bridge near Belgrade to the Creek's mouth) supports low numbers of rainbow, brown and brook trout. Environmental problems have limited the umber of fish in this stream and its fishery value is relatively low. (Bd. Exh. 37-A.2, p. 2-559, and Table 2-160.) All reaches of the Gallatin River and the East and West Forks of Hyalite Creek are noted for their outstanding recreational value. (Bd. Exh. 40, Table H-1.)

42. The Madison River is nationally recognized as a premier wild trout river, supporting over 113,000 angler-days of use annually. (DFWP Exh. 22, Nelson Dir., p. 28.)

43. Reach #1 of the Madison River, which extends from the Yellowstone National Park boundary to Hebgen Reservoir, is noted for its fall fishing, when brown trout leave Hebgen Reservoir for spawning sites in Yellowstone National Park. (DFWP Exh. 22, Nelson Dir., p. 28.)

44. Reach #2 of the Madison River, which extends from Hebgen Dam to the confluence of the West Fork Madison River, and Reach #3, from the West Fork Madison River to Ennis Reservoir, provide nationally acclaimed fishing for resident rainbow and brown trout. The downstream portion of Reach #3 also supports a remnant population of arctic grayling. (DFWP Exh. 22, Nelson Dir., pp. 28 and 29.)

45. Reach #4 of the Madison River, from Ennis Dam to the River's mouth, suffers in summer from solar heating of stored water in Ennis Reservoir. Summer heating affects the growth, survival and catchability of trout in Reach #4. Despite higher than preferred water temperatures, both rainbow and brown trout endure, occasionally reaching densities as high as 6,000 trout per mile in some stretches in some years. Added flow depletions will contribute to the further warming of Reach #4. Summer water temperature increases as little as one or two degrees could prove very detrimental to the fishery. (DFWP Exh. 22, Nelson Dir., p.

28; DFWP Exh. 3, Nelson Obj., pp. 2 through 5; and Bd. Exh. 37-A.2, p. 2-402.)

46. Black Sand Spring, Cougar, Duck, Grayling, Red Canyon, Trapper and Watkins creeks and the South Fork Madison River feed Hebgen Reservoir and provide crucial spawning and rearing habitats for the reservoir's self-sustaining trout populations. (DFWP Exh. 22, Nelson Dir., p. 29.)

47. Beaver and Cabin Creeks and the West Fork Madison River, which enter the upper Madison River, provide habitat for trout and provide spawning and nursery habitat for the rainbow, brown, and cutthroat populations of Earthquake Lake. (Bd. Exh. 37-A.2, pp. 2-431, 2-246 through 2-247.) (DFWP Exh. 22, Nelson Dir., p. 29.)

48. Antelope Creek, which feeds Cliff Lake in the Beaverhead National Forest, is a crucial spawning and rearing site for the lake's self-sustaining rainbow trout and the newly introduced Bear Lake strain of cutthroat trout. (DFWP Exh. 22, Nelson Dir., p. 29.)

49. Blaine Spring and O'Dell creeks are valley floor tributaries that, because of their spring creek nature, hold high numbers of brown and rainbow trout. (DFWP Exh. 22, Nelson Dir., p. 29.)

50. Moore Creek, another valley floor tributary, is a potential spawning stream for the remnant grayling population of Ennis Reservoir and the Madison River "channels". (Exh. 22, Nelson Dir., DFWP p. 29.)

51. Elk River, a tributary to the West Fork Madison River, flows entirely within the Beaverhead National Forest and provides a stream rainbow trout fishery in a wilderness setting. (DFWP Exh. 22, Nelson Dir., p. 29.)

52. Jack, Ruby, Indian, Standard, North Meadow and Squaw Creeks drain mountainous national forest lands surrounding the Madison Valley. All are excellent small stream fisheries. (DFWP Exh. 22, Nelson Dir., p. 30.) Standard Creek maintains a genecically pure poulation of westslope cutthroat trout and may support fluvial artic grayling. (Bd. Exh. 37-A.2, pp. 2-444 to 2-445.)

53. Cherry and Hot Springs Creeks harbor resident populations of rainbow, brown and some brook trout and support spawning runs of brown trout from the Madison River. (DFWP Exh. 22, Nelson Dir., p. 30.)

54. Reaches 2 and 3 of the Madison River are noted for their outstanding recreational value. (Bd. Exh. 40, Table H-1.)

55. Because of summer low water flows, trout densities in the Jefferson River are depressed compared to those in the neighboring Madison and Big Hole rivers. The River's brown trout, which commonly reach weights of 1½-2 pounds, support a spring and fall sport fishery that is locally popular with residents of the Butte-Whitehall area. The River's use amounted to 15,260 angler-days in 1989. (DFWP Exh. 22, Nelson Dir., p. 27 and Nelson Cross, Tr. Day 4, pp. 48, 51, 69, 81, 82 and 83.)

56. The largest and one of the relatively few tributaries contributing flows to the Jefferson River during the summer irrigation season is the Boulder River. (DFWP Exh. 22, Nelson Dir., p. 27.)

57. Reach #1 of the Boulder River (from the convergence of its West and East forks to the confluence of High Ore Creek) provides, the best fishing opportunities on the river. Here, rainbow and brook trout provide a locally important fishery in a small stream setting. (DFWP Exh. 22, Nelson Dir., p. 27.)

58. Populations of trout, now dominated by brown trout, are severely depressed in Reach #2 of the Boulder River (from the confluence of High Ore Creek to Cold Spring). The aquatic environment of Reach #2 of the Boulder River is severely degraded. (DFWP Exh. 22, Nelson Dir., p. 27; Nelson Redirect, Tr. Day 4, pp. 80 and 81; Bd. Exh. 37-A.2, pp. 2-362, 363, and 367.)

59. Spring inflows rejuvenate the lower river, allowing brown trout numbers in Reach #3 of the Boulder River (from the Cold Spring to the river's mouth) to recover to a higher density. A substantial run of brown trout from the Jefferson River enters Reach #3 each fall to spawn. (DFWP Exh. 22, Nelson Dir., p. 27.)

60. The Little Boulder River, a tributary to the Boulder River, supports good numbers of brown, rainbow and brook trout in its lower segment and provides small stream fishing opportunities of local importance. (DFWP Exh. 22, Nelson Dir., p. 27.)

61. North and South Willow creeks, which feed Willow Creek Reservoir, support notable fisheries for resident rainbow and brook trout and provide important spawning and rearing habitats for the self-sustaining rainbow trout population of the reservoir. (DFWP Exh. 22, Nelson Dir., pp. 27 and 28.)

62. Willow Creek, downstream from Willow Creek Reservoir, is a locally renowned rainbow and brown trout fishery. (DFWP Exh. 22, Nelson Dir., p. 28.)

63. The South Boulder River supports a substantial trout population, comprised of rainbow, brook and brown trout. (DFWP Exh. 22, Nelson Dir., p. 28.)

64. Whitetail Creek harbors high numbers of brown trout for a small stream. (DFWP Exh. 22, Nelson Dir., p. 28.)

65. Hells Canyon Creek is one of only two known spawning sites for the rainbow trout population of the Jefferson River. The Creek also supports fairly substantial numbers of resident rainbow trout and rainbow x cutthroat hybrids. (DFWP Exh. 22, Nelson Dir., p. 28.)

66. Willow Spring Creek, a short spring-fed creek on the valley floor, was rehabilitated and successfully developed as a spawning tributary for the Jefferson River's rainbow trout. (DFWP Exh. 22, Nelson Dir., p. 28.)

67. Halfway Creek is the only stream in the Jefferson River Sub-basin that is known to support a genetically pure population of westslope cutthroat trout. (Bd. Exh. 37-A.2, p. 2-354a.)

68. The Big Hole River is recognized as an outstanding wild trout fishery. In 1989, the river supported nearly 40,000 angler-days of use. (DFWP Exh. 22, Nelson Dir., p. 23.)

69. Reach #1 of the Big Hole River, from the convergence of Warm Springs Creek and the S.F. Big Hole River to the confluence of Pintlar Creek, is the habitat of the stream-dwelling or fluvial arctic grayling, a once-common species in Montana's upper Missouri River drainage that is now being considered for threatened or endangered status. (DFWP Exh. 22, Nelson Dir., pp. 23 and 24; MTU/AFS Exh. 10, Kaya Dir., p. 2.)

70. Reach #2 of the Big Hole River, from Pintlar Creek to the old Divide Dam, is noted for its rainbow trout fishery in its downstream canyon portion. Lesser numbers of brown trout, some trophy-size, also inhabit the canyon. Upstream from the canyon, all trout numbers decline markedly and brook trout become more prevalent. (DFWP Exh. 22, Nelson Dir., p. 23.)

71. Reach #3 of the Big Hole River, from the old Divide Dam to the river's mouth, supports robust populations of brown and rainbow trout throughout much of its length, making it the most popular of the three reaches for angling. (DFWP Exh. 22, Nelson Dir., p. 23.)

72. Arctic grayling are found in Francis, Governor, LaMarche, Miner, Mussigbrod, Pintlar, Rock, Steel, Swamp and Wyman creeks and N.F. Big Hole River. Big Lake, Governor, Rock, Steel and Swamp Creeks are spawning and rearing sites for river grayling, while Deep and LaMarche creeks are probable spawning sites. Deep Creek is also an important wintering area for river grayling. (DFWP Exh. 22, Nelson Dir., p. 24.)

73. Westslope cutthroat trout, a "Species of Special Concern" that currently occupies less than eight percent of its historic Montana range, reside in Camp, Delano, Jacobson, Jerry, Moose, Pattengail, Sixmile, and Wyman Creeks. Westslope cutthroat readily hybridize with rainbow and Yellowstone cutthroat trout, species introduced throughout western Montana. Only in one Big Hole tributary, Delano Creek, have pure westslope cutthroat trout been verified through genetic testing. (DFWP Exh. 22, Nelson Dir., p. 24.) Westslope cutthroat may occupy Trapper Creek and the Wise River. However, in Trapper Creek and Wise River there is no indication that cutthroat trout have been confirmed as westslope cutthroat. (Bd. Exh. 37-A.2, p. 2-328 through 2-330 and 2-311 through 2-313.) Jacobsen Creek has cutthroat that may be pure westslope. However, genetic analysis of cutthroat from Mono Creek, an adjacent drainage, showed them to be hybridized with rainbow trout. This suggests that Jacobsen Creek cutthroat may be hybridized as well. (Bd. Exh. 37-A.2, p. 2-304.)

74. Birch, Camp, Canyon, Divide, Jerry, Moose, Trapper and Willow creeks provide notable fishing for pan-sized trout. Brook trout predominate in Birch, Camp, Divide and Trapper Creeks, while rainbow and rainbow x cutthroat hybrid trout are most numerous in Canyon, Jerry, Moose and Willow Creeks. A few cutthroat trout and brown trout are also present in some of these streams. (DFWP Exh. 22, Nelson Dir., p. 24.)

75. American, California, Corral, Deep, French, Oregon, Sevenmile, Seymour, Sixmile, Sullivan, Tenmile and Twelvemile Creeks originate on, or flow through, the 56,138-acre Mt. Haggin Wildlife Management Area, owned by DFWP. All except California and French Creeks support high numbers of pan-sized trout. Brook trout are most abundant in the 12 streams. French and California Creeks have relatively low munbers of fish (Bd. Exh. 37-A.2, pp. 2-288, 2-291.) Nine streams also contain rainbow trout, four support rainbow x cutthroat hybrids, and one (Sixmile Creek) has cutthroat trout of unknown genetic purity. (DFWP Exh. 22, Nelson Dir., p. 24.)

76. Reservations are sought for the Wise River and three of its 50+ tributaries (Jacobson, Pattengail, and Wyman Creeks). Virtually all of the Wise River drainage is within the confines of the Beaverhead National Forest. Here, the brook trout is the most numerous trout species. Lesser numbers of rainbow, cutthroat and rainbow x cutthroat hybrid trout intermingle with the brook trout. The overall population of fish in the Wise River is extremely low. (Bd. Exh. 37-A.2, pp. 2-312-313.) Jacobson Creek is the only known Wise River tributary where cutthroat trout dominate the population. (DFWP Exh. 22, Nelson Dir., p. 25.)

77. Reservations are sought for the North Fork Big Hole River and five of its tributaries (Johnson, Joseph, Mussigbrod, Ruby and Trail Creeks). The U.S. Forest Service (USFS) is the major land

holder in the North Fork drainage, except for the North Fork itself which passes entirely through private lands. In Trail Creek the fish population is severely depressed. (Bd. Exh. 37-A.2, p. 2-230.) Brook trout are by far the most numerous trout species. A few of these streams also support low numbers of rainbow and rainbow x cutthroat hybrids. (DFWP Exh. 22, Nelson Dir., p. 25.)

78. Bear, Bryant, Fishtrap, LaMarche and Pintlar Creeks are locally noted for their brook trout fishing. These drainages are primarily within mountain forest lands controlled by the USFS. (DFWP Exh. 22, Nelson Dir., p. 25.)

79. Reaches #1 and #2 of the Big Hole River, Deep, LaMarche, Miner, Pattengail, and Wyman Creeks are noted for their outstanding recreational value. (Bd. Exh. 40, Table H-1.)

80. Big Lake, Francis, Governor, Miner, Rock, Steel, Swamp and Warm Springs Creeks and S.F. Big Hole River, all brook trout fisheries of local significance, feed the upper Big Hole River. (DFWP Exh. 22, Nelson Dir., p. 25.)

81. The Ruby River supported over 11,000 angler-days of use in 1989, despite limited public access to the river. (Exh. 22, Nelson Dir., DFWP p. 33.)

82. Reach #1 of the Ruby River, which extends from the convergence of its East, Middle and West forks to Ruby Reservoir, is, overall, not noted as an exceptional fishery. However, below the confluence of Warm Springs Creek, trout numbers are rated as good. Here, rainbow trout and lesser numbers of brown trout sustain a sport fishery of local importance. (DFWP Exh. 22, Nelson Dir., p. 33.)

83. Reach #2 of the Ruby River, from Ruby Dam to the River's mouth, provides a notable sport fishery. Brown trout in the 10-14 inch class are the mainstay of the fishery. In the fall, large numbers of brown trout from the Jefferson River enter the Ruby River to spawn. (DFWP Exh. 22, Nelson Dir., p. 33.)

84. The East, Middle and West forks of the Ruby River, all of which harbor rainbow trout, rainbow x cutthroat hybrids and a few cutthroats, support depressed trout populations, the consequence of a sedimentation problem. (DFWP Exh. 22, Nelson Dir., p. 33.)

85. Coal and N.F. Greenhorn Creeks are small, headwater, mountain tributaries in the Beaverhead Forest that harbor westslope cutthroat trout, a "Species of Special Concern" in Montana. (DFWP Exh. 22, Nelson Dir., p. 33.)

86. The importance of Warm Springs Creek rests with its flow contribution to the Ruby River. The warm, nutrient-laden water of Warm Springs Creek has a positive influence on the aquatic

productivity of the river, allowing a 4-7 fold increase in the river's game fish population immediately below the Creek's confluence. (DFWP Exh. 22, Nelson Dir., p. 33.)

87. Cottonwood Creek is, like the three forks of the Ruby, another major tributary impacted by siltation. Low numbers of rainbow and rainbow x cutthroat hybrid trout inhabit the creek. (DFWP Exh. 22, Nelson Dir., p. 33.)

88. Mill Creek provides a noteworthy small stream fisheries for pan-sized brook trout. (DFWP Exh. 22, Nelson Dir., p. 33.) While Wisconsin Creek is similar in some ways to Mill Creek it has been classified as a stream with limited fishery value. (Bd. Exh. 40, p. 6-7.)

89. The Red Rock River is one of southwest Montana's lesser known sport fisheries. While angler use is relatively light, the river fishery has regional significance. (DFWP Exh. 22, Nelson Dir., p. 30.)

90. Reach #1 of the Red Rock River, from Lower Red Rock Lake to Lima Reservoir, supports brook and cutthroat trout and a few arctic grayling. This reach produces some larger-size brook and cutthroat trout of 3-4 pounds. (DFWP Exh. 22, Nelson Dir., p. 30.)

91. Reach #2 of the Red Rock River, from Lima Dam to Clark Canyon Reservoir, supports respectable densities of brown and rainbow trout, particularly in its downstream segment, and provides important spawning and rearing habitats for the trout populations of Clark Canyon Reservoir. (DFWP Exh. 22, Nelson Dir., p. 30.)

92. Corral, Hell Roaring, Odell, Red Rock and Tom Creeks, which feed the waters of the Red Rock Lakes National Wildlife Refuge, are important spawning tributaries for the arctic grayling and cutthroat trout populations of the Red Rock Lakes. The streams also harbor good numbers of resident brook trout and some cutthroat trout. (DFWP Exh. 22, Nelson Dir., pp. 30 and 31.)

93. Narrows Creek, a tributary to Elk Lake in the Centennial Valley, is the sole spawning site for the lake's arctic grayling and provides important spawning habitat for lake-dwelling cutthroat trout. (DFWP Exh. 22, Nelson Dir., p. 31.)

94. Jones and Peet Creeks are populated exclusively with westslope cutthroat trout, a "Species of Special Concern" in Montana. (DFWP Exh. 22, Nelson Dir., p. 31.)

95. Long Creek holds good numbers of brook trout and hybridized cutthroat trout. (DFWP Exh. 22, Nelson Dir., p. 31.)

96. East Fork Clover Creek supports above-average numbers of brook trout and lesser numbers of genetically impure cutthroat

trout. (DFWP Exh. 22, Nelson Dir., p. 31.)

97. Bear, Browns Canyon, Cabin, Frying Pan, Indian, Rape, Shenon, Simpson and Trapper Creeks are small, extreme headwater tributaries that support westslope cutthroat trout and flow primarily through public lands controlled by the BLM and USFS. (DFWP Exh. 22, Nelson Dir., p. 31.) Bear Creek cutthroat in that drainage were not tested for determination of strain but due to their proximity to other streams with westslope cutthroat it is likely that a population is present. (Bd. Exh. 37-A.2, p. 2-85.)

98. Big Sheep Creek, a large spring-fed stream flowing into the Red Rock River, is well known for its brown and rainbow trout, which consistently reach lengths in excess of 20 inches. (DFWP Exh. 22, Nelson Dir., p. 31.)

99. Deadman Creek, a Big Sheep Creek tributary, is, considering its small size and high elevation, a productive fishery for pan-sized rainbow trout and rainbow x cutthroat hybrids. (DFWP Exh. 22, Nelson Dir., p. 31.)

100. Black Canyon Creek contains excellent numbers of brook trout, while Bloody Dick and Medicine Lodge Creeks, which hold both brook and rainbow trout, support some of the highest trout densities for streams in the Red Rock drainage. (DFWP Exh. 22, Nelson Dir., p. 31.)

101. Horse Prairie Creek, the second largest tributary to Clark Canyon Reservoir, is populated with brown, brook and rainbow trout. While not noted for an abundance of trout, the Creek's fish, particularly the brown trout, reach above-average sizes. (DFWP Exh. 22, Nelson Dir., p.31.) The natural channel and flow of this stream has been altered and electro-fishing indicates fairly low numbers of resident fish. (Bd. Exh. 37-A.2, p. 2-99 and Table 2-26.) However, the Creek also provides spawning habitat for rainbow and brown trout from Clark Canyon Reservoir. (DFWP Exh. 22, Nelson Dir., p. 31.)

102. The Beaverhead River supports substantial fishing pressure, which amounted to 22,700 angler-days in 1989. (DFWP Exh. 22, Nelson Dir., p. 31.)

103. Reach #1 of the Beaverhead River, which extends from Clark Canyon Dam to the East Bench Diversion Dam, supports a nationally acclaimed trophy trout fishery as well as high numbers of smaller brown and rainbow trout. (DFWP Exh. 22, Nelson Dir., p. 31.)

104. Reach #2 of the Beaverhead River, from the East Bench Diversion Dam to the river's mouth, supports lesser numbers of brown and rainbow trout. The fishery for 14-18 inch trout in the

Dillon area is good while the fishery progressively declines as the river approaches its mouth. (DFWP Exh. 22, Nelson Dir., p. 32.)

105. Brown, rainbow, brook and rainbow x cutthroat hybrid trout reside in lower Grasshopper Creek, where mine pollution and dewatering have damaged the fish community. Above Bannack, the source of the mine pollution, the Creek harbors excellent numbers of brook trout. (DFWP Exh. 22, Nelson Dir., p. 32.)

106. Blacktail Deer Creek holds less than expected trout numbers for a stream of its size. Brook and a few rainbow trout inhabit this stream. (DFWP Exh. 22, Nelson Dir., p. 32.)

107. The East Fork of Blacktail Deer Creek is a better fishery than the mainstem and, overall, provides fair to good fishing for pan-sized brook trout and a few rainbows. The East Fork drainage is entirely within the public domain, mainly the 18,000-acre Blacktail Wildlife Management Area owned by DFWP. (DFWP Exh. 22, Nelson Dir., p. 32.) The West Fork of Blacktail Creek Creek has only a fair fish population, probably due to sediment loads. (Bd. Exh. 37-A.2, p. 2-130.)

108. Three small tributaries in the Grasshopper Creek drainage have reservation requests. Reservoir Creek holds genetically pure westslope cutthroat trout. The East and West forks of Dyce Creek support relatively high numbers of brook and rainbow x cutthroat hybrid trout for streams of their size. (DFWP Exh. 22, Nelson Dir., p. 32; Bd. Exh. 37-A.2, p. 2-120.)

109. Poindexter Slough is one of Montana's most productive spring-fed Creeks, supporting high numbers of rainbow and brown trout. The lower three miles of stream flow through lands owned by DFWP. (DFWP Exh. 22, Nelson Dir., p. 32.)

110. Reach #1 and Reach #2 of the Beaverhead River, Grasshopper, and Deadman Creeks are noted for their outstanding recreational value. (Bd. Exh. 40, Table H-1.)

111. Spawning trout from Canyon Ferry Reservoir, which ascend Reach #1 (from the convergence of the Gallatin, Jefferson and Madison rivers to Canyon Ferry Reservoir) of the Missouri River, provide high quality fishing in the stretch of river below Toston Dam. Brown trout, some in the 6-10 pound trophy class, ascend the river from late August through mid-December. In the spring, reservoir rainbow trout, averaging about 17 inches and two pounds, enter the river. About 10,700 angler-days of fishing pressure were expended on Reach #1 in 1989. (DFWP Exh. 22, Nelson Dir., p. 34.)

112. Sixteenmile Creek is regionally recognized for supporting exceptionally high numbers of rainbow and brown trout in its middle stream segment. (Bd. Exh. 37-A.2, pp. 2-587 and 2-588.)

113. Avalanche, Beaver, Confederate, Crow, Deep, Dry and Duck Creeks are stream fisheries of local importance. Rainbow and rainbow x cutthroat hybrid trout dominate in Avalanche, Crow, Deep, and Dry Creeks, while brook trout are most numerous in Beaver, Confederate and Duck Creeks. (DFWP Exh. 22, Nelson Dir., p. 34.)

114. Beaver, Confederate, Deep, Dry and Duck Creeks support, in addition to resident trout populations, spring spawning runs of rainbow trout from Canyon Ferry Reservoir. (DFWP Exh. 22, Nelson Dir., p. 34)

115. DFWP has requested instream flow reservations on five stream reaches between Canyon Ferry Dam and Fort Peck Reservoir. These are designated as Reaches 2, 3, 4, 5, and 6. (Bd. Exh. 37-A.3, pp. 3-6, 3-13, 3-22, 3-28, and 3-33.)

116. Reach #2 is a free-flowing 3.5 mile segment of the Missouri River between Hauser Dam and Holter Reservoir and is a very popular fishing water. It supports one of the highest densities of rainbow trout found in Montana waters. (Bd. Exh. 37-A.3, pp. 3-6 and 3-7.)

117. Reach #2 is one of the best trout fisheries in Montana during periods when spawning fish migrate from Holter Reservoir to spawn in the short reach of flowing river below Hauser Dam. (DFWP Exh. 30, Spoon Dir., p.3.)

118. Fish population estimates in Reach #2 show exceptional rainbow trout densities of 3,000 to 6,000 trout per mile have occurred in the last five years. The stream section is also particularly noted for producing trophy brown trout up to 12 pounds during the fall spawning period. (DFWP Exh. 30, Spoon Dir., p. 3.)

119. There is considerable fishing pressure in Reach #2. During October of 1982, 1983 and 1985, when brown trout spawners were concentrated below Hauser Dam, angler use estimates ranged from 810 to 1,049 angler days. During 1983, between March 1 and November 30, an estimated 8,719 angler days were expended on the river. A total of 3,662 actual interviews with anglers were made to derive these estimates. (DFWP Exh. 30, Spoon Dir., pp. 3 and 4.)

120. Reach #2 provides the primary spawning area for brown trout, rainbow trout and kokanee residing in Holter Reservoir. Juvenile fish produced in the River contribute to the fisheries of both the river and the reservoir. (DFWP Exh. 30, Spoon Dir., p. 4.)

121. Spawning habitat in Reach #2 is limited and is confined to four relatively small areas below the dam. The amount of spawning habitat is very much a function of the flow pattern of the River below the dam. The amount of available spawning habitat

changes as flows change, and once spawning has occurred, it is critical to maintain adequate flows to ensure that incubating eggs remain adequately covered with water. (DFWP Exh. 30 Spoon Dir., p. 5 and Attachment B.)

122. Kokanee that reside in Holter Reservoir are seasonably abundant in Reach #2 during the fall spawning period and this flowing segment of river is particularly important for meeting their spawning requirements. (Bd. Exh. 37-A.3, p. 3-7.)

123. Reach #3 of the Missouri River is a popular and heavily utilized recreation area between Holter Dam and Great Falls which supports an exceptional wild rainbow and brown trout fishery. From 80% to 90% of the existing recreational use is attributed to fishing. Public access is good. A frontage road, officially designated as a state recreation road, parallels much of the river reach downstream to Cascade. There are eight state recreation areas and one fishing access site. From Cascade to Great Falls, there are two additional fishing access sites and an additional state recreation area. (Bd. Exh. 37-A.3, p. 3-13; DFWP Exh. 29, Berg Dir., p. 2.) This reach is rated as having outstanding recreational value. (Bd. Exh. 40, Table H-1.)

124. Electrofishing estimates in Missouri River Reach #3 conducted by DFWP in 1988 near Craig showed 4,150 rainbow trout and 466 brown trout 10 inches and larger per mile of river. At Cascade, the population declines to 930 rainbow trout and 172 brown trout per mile. From Cascade to Great Falls, trout remain the dominant game fish along with some burbot and walleye. (Exh. 29, Berg Dir., DFWP p. 2.)

125. The upper 35 miles of Reach #3, from Holter Dam to Cascade, is designated a Class 1 sport fishery by DFWP and is considered one of Montana's premiere river trout fisheries. (DFWP Exh. 29, Berg Dir., p. 2.)

126. Angler use in Reach #3 is currently estimated at 88,400 angler days per year. From 60% to 70% of these anglers reside in Cascade and Lewis & Clark counties. Most of the angling is in the 35-mile segment from Holter Dam to Cascade where annual use is estimated at 74,000 angler days per year. Fishing use of this segment ranks second only to the Madison River statewide. An excellent overall catch rate of 0.40-0.50 rainbow trout per hour, second only to the Madison River, is maintained. (Bd. Exh. 37-A.3, p. 3-14.)

127. Side channels in Reach #3 are important for spawning and rearing of rainbow and brown trout. Side channels are preferred, particularly by brown trout, over the main channel for spawning because of more suitable depth, velocity, substrate and adjacent cover characteristics. (Bd. Exh. 37-A.3, p. 3-15.)

128. Brown trout in Reach #3 initiate spawning in mid-October and young fish emerge from the gravel in early May. Rainbow trout spawn in late March and early April and eggs incubate until mid-May. (Bd. Exh. 37-A.3, p. 3-15.)

129. Rearing of young rainbow and brown trout in Reach #3 occurs from mid-May through mid-October when large numbers of young fish move from side channels to the main river. (Bd. Exh. 37-41A, pp. 3-15 and 3-16.)

130. Canada geese nest on islands in Reach #3. The flow quantities around these islands determine whether the nests are protected from mammalian predators. Protective flows are a function of depth, width and velocity of water which inhibit or prevent mammalian predators from crossing onto the islands from the mainland. (Bd. Exh. 37-A.3, p. 3-16; DFWP Exh. 13, Hook Dir., p. 2.)

131. Reach #4, between Great Falls and the Marias River, supports a highly productive coolwater fishery, with sauger being the predominant game fish. Coldwater game fish species found in this reach include brown and rainbow trout and mountain whitefish. Other game species include burbot and shovelnose sturgeon. (DFWP Exh. 29, Berg Dir., p. 2.)

132. The upper 21 miles of the Missouri Wild and Scenic River (a national designation which begins at Fort Benton) is included in Reach #4. The Wild and Scenic River receives heavy recreational use in spite of the relative lack of access points. An average of 21,294 visitor days occurred annually between 1982 and 1986 within the Wild and Scenic corridor. About 30% of this use occurred in Reach #4. Nearly half of the use was in the form of recreational boating. (Bd. Exh. 37-A.3, p. 3-22.)

133. Angler use in Missouri River Reach #4 is currently estimated at 7,692 angler days per year. (DFWP Exh. 29, Berg Dir., p. 2.)

134. Reach #4 includes the transition zone between cold and warm water fisheries. Brown and rainbow trout and mountain whitefish (coldwater species) are common only in the upper 15 miles of this reach. Although sauger are by far the predominant game fish, walleye appear to be increasing in numbers over the past five years. The sizes of the warmwater game fish are better than the average for river populations within the state, probably due to the Missouri's productivity and the presence of suitable habitat conditions in this reach most of the time. (Bd. Exh. 37-A.3, p. 3-23.)

135. In addition to the game fish species, 22 non-game fish species have been identified in this reach. (Bd. Exh. 37-A.3, p. 3-23.)

136. Forage fish are small fish which are utilized as food for larger game and non-game species. Side channels are important habitat areas for forage species in Reach #4. They also provide important rearing habitat for sauger, smallmouth buffalo, bigmouth buffalo and goldeye. Small mouth and big mouth buffalo also utilize side channels for spawning. (Bd. Exh. 37-A.3, p. 3-25; Gardner Obj., DFWP Exh. 5, p. 2.)

137. Forage fish and young-of-the-year fish use side channel areas from early June through August 31. (Bd. Exh. 37-A.3, p. 3-25.)

138. Considerable Canada goose nesting occurs on islands in Reach #4. The flow quantities around these islands during the nesting period (March 15 - June 1) determine whether the nests are protected from mammalian predators. (Bd. Exh. 37-A.3, pp. 3-25 and 3-26.)

139. Reach #5, from the Marias River to the Judith River, supports an exceptional warmwater fishery for sauger and shovelnose sturgeon, as well as for burbot, channel catfish, and walleye. Shovelnose sturgeon in this reach attain the largest maximum size found anywhere in the United States. (DFWP Exh. 29, Berg Dir., p. 3.)

140. All 67 miles of Reach #5 are within the Upper Missouri National Wild and Scenic River corridor. About 85% of the 21,294 annual visitor days occurring in 1982-86 occurred in Reach #5. Nearly half of the use was recreational boating. (Bd. Exh. 37-A.3, p. 3-28.)

141. Paddlefish are found in Reach #5. The paddlefish is listed as a "Species of Special Concern -- Class A" in Montana. The Montana population is one of only six major self-sustaining populations of these ancient and unique fish that remain in the United States. Paddlefish are Montana's largest game fish, with female specimens often reaching five to six feet in length and weighing 75 to 125 pounds. Paddlefish have been significantly reduced over their worldwide range. (Bd. Exh. 37-A.1, p. 1-40; Bd. Exh. 37-A.3, p. 3-17.)

142. The Missouri River paddlefish population has growth rates that are superior to the other five remaining populations. This population is also older and more secure than those found anywhere else in North America, due largely to the free-flowing characteristics of this River Reach which provides essential and irreplaceable spawning areas for paddlefish. (Bd. Exh. 37-A.1, pp. 1-40 and 1-41.)

143. Paddlefish occupy Reach #5 only during the spawning season. Most of their lives are spent in Fort Peck Reservoir. Paddlefish leave the reservoir during high spring flows and migrate

upstream to spawn, frequently being observed as far upstream as the mouth of the Marias River. (Bd. Exh. 37-A.3, p. 3-29.)

144. Four paddlefish spawning areas have been identified in Reach #5 in the vicinities of Three islands, Virgelle Ferry, Little Sandy Creek and Deadmans Rapids. The spawning period is from May 19 through July 5. (Bd. Exh. 37-A.3, p. 3-29; DFWP Exh. 29, Berg Dir., p. 3.)

145. Although paddlefish receive light fishing pressure in Reach #5 because of limited access and low populations, critical paddlefish spawning areas in this reach help sustain the sport fishery for paddlefish on the Charles M. Russell Game Range within Reach #6. (DFWP Exh. 29, Berg Dir., p. 3.)

146. Two other ancient fish - the pallid and shovelnose sturgeons - also occur in Reach #5. Pallid sturgeon are very rare. They occur only as a relic population containing very few numbers in Montana and the species has recently been listed (October 1990) by the U.S. Fish and Wildlife Service as a federal endangered species. (DFWP Exh. 17, Spence Dir., p. 11; DFWP Exh. 29, Berg Dir., p. 3.)

147. The shovelnose sturgeon in the Missouri River are healthy and vigorous. Those residing above Fort Peck Reservoir are much larger than those found in other areas of the Missouri and Mississippi basins. The <u>average</u> size of shovelnose from the middle Missouri River equal or exceed the <u>maximum</u> size of those from the other rivers. (Bd. Exh. 37-A.1, p. 1-41.)

148. The paddlefish, pallid sturgeon and sturgeon chub are all fish species residing in Reach #5 which are considered "Species of Special Concern". Pallid sturgeon and sturgeon chub are considered rare throughout their entire geographic range. (DFWP Exh. 29, Berg. Dir., p. 3.)

149. Side channels are important fish habitats in Reach #5. A side channel is a channel diverging from the main channel and containing less than 20% of the river's flow. In reaches 4, 5 and 6, there are about 70 side channels ranging in length from 0.2 to 1.4 miles. (DFWP Exh. 5, Gardner Obj., p. 2.)

150. Side channels in Reach #5 provide important rearing habitat for sauger, bigmouth and smallmouth buffalo and goldeye as well as spawning areas for buffalo. Side channels are also important for production of forage fish. (DFWP Exh. 5, Gardner Obj., p. 2.)

151. Side channels become dewatered when water levels become too shallow to support fish or contain only pools which are disconnected from the main channel due to declining river flow. Sometimes only pools of standing water remain that can eventually

dry up or become unsuitable for fish life due to high water temperatures and low dissolved oxygen. The loss of side channel habitat means less food production for fish and fewer numbers of species that depend on the side channels for rearing of young fish, notably the sauger. (DFWP Exh. 5, Gardner Obj., p. 2.)

152. Riffle habitat is essential for forage food production which includes aquatic insects and small riffle fish such as sculpin, dace and stonecat. (DFWP Exh. 5, Gardner Obj., p. 2.)

153. Considerable Canada goose nesting occurs in Reach #5. An average of 38% of the total nests surveyed between Fort Benton and Fort Peck Reservoir were in Reach #5. Flow levels around goose-nesting islands determine whether the nests will have protection from mammalian predators. (Bd. Exh. 37-A.3, pp. 3-31 and 3-32.)

154. Missouri River Reach #6 extends from the Judith River to the upper end of Fort Peck Reservoir. An exceptional warmwater fishery is found in this reach. Paddlefish, sauger, shovelnose sturgeon and channel catfish are the predominant game fish species found throughout the Reach. Burbot also occur. (DFWP Exh. 29, Berg Dir., p. 4.)

155. Six paddlefish spawning areas have been identified in Reach #6 in the vicinities of Holmes Rapids, Dauphine Rapids, Bullwhacker Creek, Cow Island, Two Calf Islands, and Robinson Bridge. These spawning areas are critical for paddlefish recruitment into the sport fishery which occurs on the Charles M. Russell Game Range in the lower 20 miles of this Reach. (DFWP Exh. 29, Berg Dir., p. 4.)

156. There is a significant paddlefish sport fishery on the Charles M. Russell Game Range. Anglers come from a wide geographic area and the sport fishery is of statewide importance. (DFWP Exh. 29, Berg Dir., p. 4.)

157. Paddlefish are a "Species of Special Concern" in Montana due to their limited distribution and limited habitat available, but not because of low abundance. Paddlefish populations in Montana are not being adversely affected by angler harvest because overall angler success and the average size of paddlefish are not declining. (DFWP Exh. 29, Berg Dir., p. 4.)

158. Missouri River Reach #6 also contains three other "Species of Special Concern" - the pallid sturgeon, sicklefin chub, and sturgeon chub. All three are rare throughout their geographical range and the pallid sturgeon is a federally listed endangered species. (DFWP Exh. 29, Berg Dir., pp. 4-5.)

159. Twenty-three non-game species have been identified in Reach #6. Blue sucker, smallmouth buffalo, bigmouth buffalo, and fresh water drum are four non-game migratory species that are

dependent on high spring flows in the Missouri River for successful reproduction. (Bd. Exh. 37-A.3, p. 3-35.)

160. Side channels in Reach #6 are important for forage fish production and rearing areas for sauger, goldeye, smallmouth buffalo and bigmouth buffalo. Water level conditions in side channels are related to main river flow. (Bd. Exh. 37-A.3, p. 3-36.)

161. Paddlefish residing in Fort Peck Reservoir and the Missouri River require a very substantial flow (certainly greater than 4652 cfs) in Reach #6 to initiate their annual spring spawning migration from May 19 through July 5. (Bd. Exh. 37-A.3, p. 3-37; DFWP Exh. 29, Berg Dir., p. 6)

162. A fair amount of Canada goose nesting occurs on the Missouri River in Reach #6. An average of 13% of the total nests surveyed between Fort Benton and Fort Peck Reservoir are within this Reach. Flow levels around goose-nesting islands determine whether the nests will have protection against mammalian predators. The goose-nesting period is March 15 - June 1. (Bd. Exh. 37-A.3, pp. 3-36 and 3-37.)

163. DFWP has requested instream flow reservations on ten Missouri River Basin tributaries between Canyon Ferry and Holter dams. These streams are: Spokane Creek, McGuire Creek, Trout Creek, Prickly Pear Creek, Sevenmile Creek, Tenmile Creek, Silver Creek, Beaver Creek, Willow Creek, and Cottonwood Creek. (Bd. Exh. 37-A.3, pp. 3-39 to 3-81.)

164. Spokane Creek, McGuire Creek and Trout Creek are all spring-like streams that flow into Hauser Lake. Spokane Creek contains brown and rainbow trout, kokanee and mountain whitefish. Brown trout, kokanee and mountain whitefish migrate from Hauser Reservoir into Spokane Creek to spawn. McGuire Creek contains brown and rainbow trout and kokanee. This Creek also provides important spawning habitat for rainbow and brown trout and kokanee migrating from Hauser Reservoir. Trout Creek contains brown and rainbow trout, kokanee and mountain whitefish. The stream contains good populations of resident brown and rainbow trout. In addition, Trout Creek is a spawning and rearing tributary for brown and rainbow trout and kokanee migrating from Hauser Reservoir. (Bd. Exh. 37-A.3, pp. 3-41, 3-42, 3-44, 3-47 and 3-48; DFWP Exh. 14, Lere Dir., p. 4.)

165. Trout Creek is the most important tributary for spawning and rearing of kokanee, brown trout, mountain whitefish and rainbow trout that migrate from Hauser Reservoir. Spawning rainbow and brown trout up to 9 pounds have been collected. It is also an important rearing stream for juveniles of these salmonids. Trout Creek also contains a good resident fish population of rainbow and brown trout. Bald eagles concentrate at the mouth of Trout Creek

during the fall kokanee spawning season. Trout Creek is a designated public viewing area for the fall congregation of bald eagles. (DFWP Exh. 14, Lere Dir., pp. 5 and 6.)

166. Silver Creek is a spring-like stream entering Lake Helena. It contains brown, rainbow and brook trout and kokanee. It also provides spawning and rearing habitat for these species which migrate from Hauser Reservoir and Lake Helena. (Bd. Exh. 37-A.3, pp. 3-67 and 3-68.)

167. Prickly Pear Creek flows into Lake Helena. Sevenmile and Tenmile Creeks are tributaries to Prickly Pear Creek. Tenmile and Sevenmile Creeks provide fisheries for rainbow trout and brook trout. Brown trout are found in the lower portion of Tenmile Creek. Game fish populations in both streams are greater in upstream sections because of dewatering of the lower Reaches. (DFWP Exh. 14, Lere Dir., p. 8; Bd. Exh. 37-A.3, pp. 3-59 through 3-60 and 3-64 through 3-65.)

168. Prickly Pear Creek Reach #1 (Rabbit Gulch to East Helena) supports a relatively good resident trout population of rainbow and brown trout. The upper section of this Reach contains a good brook trout population. The Reach has important recreational values due to its close proximity to the Helena area. (DFWP Exh. 26, Frazer Dir., p. 21; Bd. Exh. 37-A.3, pp. 3-52 and 3-53.)

169. Prickly Pear Creek Reach #2 (East Helena to Lake Helena) supports a resident population of brown and rainbow trout. Brown and rainbow trout from the Lake Helena - Hauser Reservoir complex also migrate through this Reach to spawn. It has a high recreational value because of its close proximity to Helena. (DFWP Exh. 26, Frazer Dir., p. 22; Bd. Exh. 37-A.3, p. 3-56.)

170. Beaver Creek, Willow Creek and Cottonwood Creek are all tributaries to Holter Lake. Beaver Creek is the most important tributary for spawning and rearing of rainbow trout that migrate from Holter Reservoir as well as from the 3.5 mile section of Missouri River between Hauser Dam and Holter Reservoir. Extensive rainbow spawning occurs in Beaver Creek during the spring high flow period and they provide an excellent fishery at that time. Brown trout from the Missouri River occasionally use Beaver Creek for spawning in the fall. There are also resident populations of rainbow, brown and cutthroat trout which provide a good fishery in Beaver Creek. (DFWP Exh. 14, Lere Dir, p. 6; Bd. Exh. 37-A.3, pp. 3-70 and 3-71.)

171. Cottonwood and Willow Creeks contain rainbow, brown and brook trout that provide a moderate fishery. Migrant rainbow and brown trout and kokanee from Holter Reservoir sometimes use these two streams for spawning. (DFWP Exh. 14, Lere Dir., p. 7; Bd. Exh. 37-A.3, pp. 3-74, 3-75, 3-78 and 3-79.)

172. Reach #1 of Little Prickly Pear Creek (Canyon Creek to Clark Creek) supports a good resident trout population consisting of brown, rainbow and brook trout, and mountain whitefish. Brown trout are the dominant trout species. The lower end of Reach #1 also provides important spawning and rearing habitat for the extremely popular Blue Ribbon trout fishery in the Missouri River below Holter Dam. (DFWP Exh. 26, DFWP, Frazer Dir., p. 13.)

173. An estimated 15,000 rainbow trout spawn in Little Prickly Pear Creek. There is also a large, unquantified brown trout spawning run. (DFWP Exh. 20, Leathe Dir., p. 7; DFWP Exh. 26, Frazer Dir., p. 15.)

174. Reach #2 of Little Prickly Pear Creek (Clark Creek to mouth) supports a resident trout fishery dominated by rainbow trout, with lesser numbers of brown trout and brook trout. It is an important recreation area between Helena and Great Falls and supports heavy public use. (DFWP Exh. 26, Frazer Dir., p. 14.)

175. Reach #2 of Little Prickly Pear Creek also provides important spawning and rearing habitat for rainbow and brown trout that migrate out of the Missouri River. A majority of the spawning and rearing occurs in Reach #2. (DFWP Exh. 26, Frazer Dir., pp. 14 and 15.)

176. Virginia Creek, Canyon Creek, Lyons Creek and Wolf Creek are tributaries to Little Prickly Pear Creek. These four streams have resident fish populations consisting of rainbow, brown and brook trout. Lyons Creek and Wolf Creek also are important spawning streams for migratory rainbow and brown trout from the Missouri River and Little Prickly Pear Creek. Rearing of the young fish from these migratory spawners also occurs in these streams. (Bd. Exh. 37-A.3, pp. 3-101 through 3-107; DFWP Exh. 26, Frazer Dir., pp. 17, 28 and 39.)

177. Virginia and Canyon Creeks contain resident populations of brook, rainbow and brown trout. Brook trout comprise 76% of the population in Virginia Creek. Rainbow trout make up 49% of the population in Canyon Creek, with brook and brown trout equally providing the remaining 51%. These two streams provide moderate to good fisheries for these resident salmonids. The Canyon Creek fishery is very popular with local anglers. (DFWP Exh. 14, Lere Dir., p. 8; Bd. Exh. 37-A.3, pp. 3-93 through 3-98.)

178. The Dearborn River is a tributary to the Missouri River below Holter Dam and is one of the most important trout streams in Montana. It is known to have good fishing for resident trout (mostly rainbow) in the 8-12 inch range, particularly in its upper Reaches. Brown trout are found in the lower river and will average somewhat larger than the rainbow. Brook trout are present in the headwaters. The Dearborn provides up to 2,500 angler-days of

fishing annually. (Bd. Exh. 37-A.3, p. 3-118; DFWP Exh. 20, Leathe Dir., p. 5.)

179. In addition to its resident fishery, the Dearborn is an important spawning tributary for rainbow trout that reside in the Missouri River. The results of a spring 1988 spawning survey indicated that the Dearborn River is the most important spawning stream for rainbow trout which inhabit the Missouri River between Holter Dam and Cascade. (Bd. Exh. 37-A.3, p. 3-119; DFWP Exh. 20, Leathe Dir., pp. 5 through 7.)

180. Fish trapping and a helicopter survey of the Dearborn River in the spring of 1988 confirmed that large numbers of rainbow trout utilized the stream for spawning. Over 2,300 mature rainbow trout, averaging 14.9 inches in length, were captured and marked. It was estimated that approximately 20,000 rainbows use the Dearborn River for spawning. During the April helicopter survey of the lower 42 miles of the Dearborn, approximately 6,000 spawning nests (redds) were counted. Spawning rainbow trout were observed on many redds. Spawning areas were easily identified because of the abnormally low water and good visibility occurring under near-drought conditions. Most spawning was concentrated in the lower 30 miles of river. (DFWP Exh. 20, Leathe Dir., p. 6; Bd. Exh. 37-A.3, pp. 3-118 and 3-119.)

181. Tag returns by anglers fishing the Missouri River confirmed that the spawning rainbow trout in the Dearborn River were inhabitants of the Missouri River. (DFWP Exh. 20, Leathe Dir., p. 6.)

182. Spawning habitat in the Dearborn River is critical to the perpetuation of the Missouri River fishery. The Dearborn is one of only three tributaries to the Missouri River where Missouri River fish spawn. The other two streams are Sheep Creek and Little Prickly Pear Creek, but the Dearborn is the most heavily used spawning stream. (DFWP Exh. 20, Leathe Dir., p. 7.)

183. The Dearborn River is noted for its outstanding recreational value. (Bd. Exh. 40, Table H-1.)

184. Instream flow requests have been made for the Middle and South Forks of the Dearborn River and Flat Creek. The Middle and South Forks of the Dearborn both have very good rainbow trout populations. Numbers of rainbows longer than three inches range between 350 and 400 per thousand feet of stream. The Middle Fork contains rainbows up to 16 inches long. Rainbow trout from the Dearborn River also use the Middle and South Forks for spawning only in their lower reaches. Beaver dams apparently limit upstream fish migration of these 12-16 inch fish. (DFWP Exh. 20, Leathe Dir., p. 8.)

185. Flat Creek has relatively low trout populations but is the most heavily fished of the three tributary streams. Fishing pressure is approximately 340 angler-days per year. Flat Creek contains rainbow, brook and brown trout, and mountain whitefish. (Bd. Exh. 37-A.3, pp. 3-130 and 3-131.)

186. Wegner Creek and Stickney Creek are tributaries to the Missouri River near the town of Craig. The lower reaches of both streams are intermittent and flows only reach the Missouri River during spring runoff periods. Although both streams support resident rainbow trout populations in upstream sections, their principal value lies in their being spawning streams. During spring runoff, both streams are important spawning streams for Missouri River rainbow trout when flows are available. When natural spring flows occur during good water years, spawning rainbow trout are able to migrate through the normally dewatered sections and reach the perennial flowing sections upstream. (DFWP Exh. 26, Frazer Dir., pp. 26 and 27; Bd. Exh. 37-A.3, pp. 3-109, 3-110, 3-112 and 3-113.)

187. Sheep Creek flows directly into the Missouri River near Cascade 24 miles downstream from Holter Dam. It is a critically important spawning stream for rainbow trout that reside in the Missouri River. (DFWP Exh. 20, Leathe Dir., p. 9.)

188. Approximately 3,500 to 4,400 spawning rainbow trout, averaging about 16 inches long, migrate into Sheep Creek each year to spawn. Brown trout and mountain whitefish also migrate from the Missouri River to spawn in Sheep Creek. (DFWP Exh. 20, Leathe Dir., p. 9.)

189. Tag returns by anglers fishing the Missouri River show that spawning rainbow trout in Sheep Creek inhabit the Missouri River from four miles upstream to 15 miles downstream from the mouth of Sheep Creek. Sheep Creek is the most important spawning area for rainbow trout residing in this portion of the Missouri River. (DFWP Exh. 20, Leathe Dir., p. 10.)

190. Sheep Creek contains a resident population consisting of rainbow, brown and brook trout and provides up to 800 angler-days of use each year. However, its principal importance is as a spawning tributary for the Missouri River. (Bd. Exh. 37-A.3, pp. 3-134 and 3-135.)

191. The Smith River is one of the most popular trout fisheries in the state. An average of over 12,000 anglers per year fished the Smith River with about two-thirds of the use above the mouth of Hound Creek. The Smith River has been managed as a wild trout fishery since trout stocking was discontinued in 1974. (Bd. Exh. 37-A.3, pp. 3-142 and 3-143.)

192. Three stream reaches have been established by DFWP on the Smith River. All three reaches are noted for their outstanding recreational value. (Bd. Exh. 40, Table H-1.) Rainbow, brown, brook and cutthroat trout and mountain whitefish and burbot are present in all three reaches. Rainbow trout are the predominant species present in all three reaches, followed by brown trout and whitefish. (Bd. Exh. 37-A.3, pp. 3-143, 3-146 and 3-149.)

193. The most popular fishing on the Smith River is the 60-plus mile scenic floating section between Camp Baker (at the mouth of Sheep Creek) and Eden Bridge (below Hound Creek.) Fishing comprises one of the most important activities while floating this stretch of river. Access to this reach is gained almost exclusively by floating. Floating is currently limited to about mid-April through the first week in July in an average water year. (DFWP Exh. 4, Spence Obj., p. 6; DFWP Exh. 21, Wipperman Dir., p. 3; Bd. Exh. 37-A.3, p. 3-143.)

194. An instream flow in the Smith River will maintain the existing rainbow and brown trout populations in the river and maintain habitat for spawning and rearing of game fish and the production of aquatic food organisms used by rainbow and brown trout. Maintenance of existing habitat and trout populations will continue to provide a quality experience for outdoor recreation associated with the river. (DFWP Exh. 21, Wipperman Dir., p. 3.)

195. DFWP has filed instream flow requests on 10 tributaries to the Smith River. These are the South Fork Smith River, North Fork Smith River, Newlan Creek, Big Birch Creek, Sheep Creek, Eagle Creek, Rock Creek, Tenderfoot Creek, North Fork Deep Creek and Hound Creek. (Bd. Exh. 37-A.3, pp. 3-151 through 3-186.)

196. All of the 10 Smith River tributaries support significant trout populations and comprise an important fishery resource. Most of the streams provide a few hundred days of fishing recreation each year and a few sustain more than one thousand angler-days in some years. (DFWP Exh. 20, Leathe Dir., p. 3.)

197. Rainbow and brook trout tend to predominant in the Smith River tributaries, with the largest fish typically ranging from 11-14 inches long. Brook trout populations are especially high in the South Fork Smith River, Big Birch Creek and in Newlan Creek. Sheep Creek has an exceptional rainbow trout population above Moose Creek with more than 900 fish per 1,000 feet of stream. Rock Creek and Tenderfoot Creek also have outstanding rainbow and/or hybrid cutthroat trout populations. Eagle Creek supports populations of rainbow, cutthroat and brook trout. (DFWP Exh. 20, Leathe Dir., p. 3.)

198. The North Fork of Deep Creek contains a genetically pure westslope cutthroat trout population (a "Species of Special Concern" in Montana). This is the only species occupying the reach

of stream where instream flows have been requested. Rock outcrops form natural barriers that prevent the upstream migration of hybrid cutthroat trout from the South Fork into the North Fork of Deep Creek. (Bd. Exh. 37-A.3, p. 3-182.)

199. Sun River Reach #1 begins at Diversion Dam below Gibson Reservoir and flows for 32 miles downstream to the confluence of Elk Creek. The present trout fishery is rated as fair and there has been a considerable amount of angler use over the years. Rainbow and brown trout and mountain whitefish are the principal game fish species in Reach #1. Brown trout become more abundant in the lower portion of this Reach. Sizes of trout and whitefish are about average compared to other populations in the state. (DFWP Exh. 36, Gardner Dir., p. 3; Bd. Exh. 37-A.3, p. 3-192.)

200. Reach #1 of Sun River contains brown trout and whitefish which average about 11 inches in length, with some brown trout growning to 23 inches; rainbow trout average about 8 inches with some specimens reaching nearly 18 inches in length. Reach #1 of the Sun River experiences severe dewatering during the summer irrigation season. Inadequate streamflows and elevated water temperatures have suppressed the trout fishery in this Reach. (Bd. Exh. 37-A.3, pp. 3-192.)

201. Sun River Reach #2 extends from Elk Creek to the mouth. The present fishery is rated as fair for the majority of this section and there has been a considerable amount of angler-use over the years. Brown and rainbow trout, mountain whitefish, northern pike and burbot are found in this Reach. Brown trout are the most abundant game fish. Whitefish are fairly common in the upper half of the Reach, while rainbow trout are uncommon in the lower River. A small population of northern pike and burbot reside in the lower 25 miles of this Reach. The average sizes of brown and rainbow trout and whitefish are 14 inches, 12 inches and 10 inches, respectively, with some brown trout reaching 23 inches in length and some rainbow reaching 17 inches. The brown trout population is well represented by large-sized fish. Rainbow trout and whitefish sizes are about average compared to other populations in the state. (Bd. Exh. 37-A.3, p. 3-195; DFWP Exh. 36, Gardner Dir., p. 3.)

202. DFWP has requested instream flows on four tributaries to the Sun River. These are North Fork Willow Creek, Willow Creek, Ford Creek and Elk Creek. (Bd. Exh. 37-A.3, pp. 3-198 through 3-209.)

203. The principal fish species in these four tributaries are brook trout, followed by rainbow and brown trout. Brook trout comprise 100% of the game fish in North Fork Willow Creek and provide a good fishery for people in the local area. Brook trout range up to 12 inches in length. Willow Creek contains mostly brook trout with some rainbow trout also present. Brook trout can range up to 12 inches in length. A pure strain of westslope

cutthroat trout occurs in the upper reaches of Willow Creek. Ford Creek supports an excellent brook trout population and is an important fishery in the area. The fishery is approximately 90% brook trout and 10% rainbow and cutthroat trout. Brook trout up to 1.25 pounds have been recorded. Elk Creek has one of the most important trout fisheries in the Augusta area and includes rainbow, brown and brook trout. The brook trout are somewhat more abundant in the upper reaches. (DFWP Exh. 35, Hill Dir., pp. 4 and 5; Bd. Exh. 37-A.3, pp. 3-198 through 3-209.)

204. Belt Creek Reach #1 (headwaters to Big Otter Creek) has a very good trout fishery. The fishery is comprised of rainbow, brown, brook and cutthroat trout and mountain whitefish. Rainbow trout are the predominant fish throughout the reach, followed by whitefish and brown trout. Cutthroat and brook trout are not as common in the mainstem as they are in some of the tributary streams and headwater areas. Average size of rainbow and brown trout and whitefish is 7 inches, 10 inches and 13 inches, respectively. Belt Creek receives a substantial amount of fishing pressure due to its convenient access and close proximity to Great Falls. Approximately 8,000 angler-days of use has occurred annually in recent years. Approximately 3,000 catchable rainbow trout are stocked annually in the lower end of Reach #1 because an adequate self-sustaining trout population cannot be maintained. (DFWP Exh. 36, Gardner Dir., p. 3; Bd. Exh. 37-A.3, pp. 3-214 and 3-215.)

205. Belt Creek Reach #2 (Big Otter Creek to Missouri River) has a moderate cold water and warm water fishery. Fish species present include sauger, rainbow trout, brown trout and mountain whitefish. A marginal resident trout fishery exists in this reach because of low stream flows, high temperatures and siltation. Rainbow trout are the most common species found. Brown trout occur throughout the reach but in fewer numbers. Some spawning by rainbow and brown trout from the Missouri River occurs in Belt Creek during their spawning seasons. Mountain whitefish also migrate into Belt Creek from the Missouri River to spawn. Sauger migrate up Belt Creek from the Missouri River during the late spring and reside in the stream until fall as long as flow conditions are adequate. Sauger range from 12-16 inches in length. (DFWP Exh. 36, Gardner Dir., p. 3; Bd. Exh. 37-A.3, p. 3-217.)

206. DFWP has requested instream flows on five tributaries to Belt Creek. These are: Dry Fork Belt Creek, Tillinghast Creek, Pilgrim Creek, Logging Creek and Big Otter Creek. (Bd. Exh. 37-A.3, pp. 3-220 through 3-238.)

207. These five Belt Creek tributary streams contain various mixtures of rainbow, cutthroat, brown and brook trout. The maximum sizes range from about 9 inches for rainbow trout up to 19 inches for brown trout. Brook and cutthroat trout reach sizes of 13 inches and 10 inches, respectively. Dry Fork Belt Creek populations appear to be less abundant than those of nearby streams

due in part to the toxic affect of heavy metals pollution from old mines. However, good instream flows and habitat conditions occur and there is a good potential for trout fishery restoration when these abandoned mines are reclaimed. Tillinghast Creek has a very good trout fishery with a light amount of angler use because of its remote location and somewhat restricted access. Brook trout are the most abundant game fish. Pilgrim Creek is unique because the trout population is comprised entirely of cutthroat trout. Cutthroat numbers are very good and the fishery receives a moderate amount of angler use. Logging Creek has a very good trout fishery with a moderate amount of angler use. Brook trout are the most abundant game fish, followed by rainbow and brown trout. Total numbers of brook and rainbow trout were 1,183 trout per mile, an abundant fish population for small streams in this area. Fishing pressure is moderate, except where considerable use occurs at a Forest Service campground. Big Otter Creek has an uncommon spring-like aquatic system and a good trout fishery containing exceptionally large-sized brown trout for a creek of this size. Brown trout are the predominant fish found throughout Big Otter Creek, followed by brook and rainbow trout. The stream receives a considerable amount of angler use. (DFWP Exh. 36, Gardner Dir., pp. 3 and 4; Bd. Exh. 37-A.3, pp. 3-220 through 3-246.)

208. Highwood Creek is a tributary to the Missouri River. This creek has an excellent trout fishery and considerable fishing pressure. Brook, rainbow, cutthroat and brown trout occupy the stream, with brook trout being the predominant fish throughout the Reach. Rainbow trout are common but less numerous. Cutthroat trout are confined to the headwater areas and brown trout have been noted only in the lower portions of the reach. Brook and rainbow trout reach 11 and 12 inches in length, respectively. (DFWP Exh. 36, Gardner Dir., p. 4; Bd. Exh. 37-A.3, pp. 3-239 and 3-240.)

209. Shonkin Creek is a Missouri River tributary that has an excellent trout fishery consisting primarily of brook trout and a few rainbow trout. This productive creek is one of only two principal trout streams found in Chouteau County and receives a fair amount of angler use, mostly by local residents. There are an estimated 1,890 brook trout per mile of stream, an especially abundant fish population for streams in this area. (DFWP Exh. 36, Gardner Dir., p. 4; Bd. Exh. 37-A.3, p. 3-244.)

210. Reach #1 of the Marias River (above Tiber Reservoir) has a fair warmwater fishery and is an important spawning stream for walleye from Tiber Reservoir. Some coldwater species (rainbow trout and mountain whitefish) also inhabit this Reach, but are in lower numbers. Other species include burbot, northern pike and channel catfish. Walleye up to 28 inches in length, whitefish up to 17 inches, rainbow up to 22 inches, burbot up to 16 inches and northern pike up to 33 inches have been found in this reach. (DFWP Exh. 36, Gardner Dir., p. 6; Bd. Exh. 37-A.3, p. 3-253.)

211. The average walleye size in Marias River Reach #1 is fairly large for a river population. The river reach also provides rearing habitat for young walleye. Large rainbow trout (average of 2 pounds) occupy the river mainly in the spring and early summer, preferring Tiber Reservoir during the rest of the year. (Bd. Exh. 37-A.3, p. 3-253.)

212. Angler use of Marias River Reach #1 is moderate to light, most likely due to its remote and fairly inaccessible location. (DFWP Exh. 36, Gardner Dir., p. 6; Bd. Exh. 37-A.3, p. 3-254.)

213. Marias River Reach #2 from Tiber Dam to Circle Bridge on Highway 223 consists of a 21-mile cold water trout fishery that produces trophy-sized brown trout. Deep, cold water releases from Tiber Dam provide conditions that are favorable for rainbow and brown trout. Stream trout fisheries are uncommon in northcentral Montana and the Marias river is, therefore, of special value. This 21-mile tailwater fishery below Tiber Dam is the only trout stream within a 50-mile radius and receives a moderate amount of angler use. (Bd. Exh. 37-A.3, p. 3-258; DFWP Exh. 36, Gardner Dir., p. 6.)

214. Reach #2 of the Marias River contains mountain whitefish, rainbow trout, brown trout, sauger, walleye, northern pike, and burbot. Whitefish are the most abundant game fish in the reach and occur in high numbers. Rainbow and brown trout occur in fair numbers and attain exceptionally large sizes. The other species occur in lower numbers. (Bd. Exh. 37-A.3, p. 3-257.)

215. Marias River Reach #2 contains rainbow trout up to 22 inches, brown trout up to 32 inches, sauger up to 22 inches, walleye up to 23 inches, northern pike up to 47 inches and burbot up to 32 inches in length. The reach also contains 14 nongame fish species. (Bd. Exh. 37-A.3, pp. 3-257 and 3-258.)

216. Marias River Reach #3 extends from Circle Bridge to the mouth. This reach has an excellent resident and migratory warmwater fishery. Resident species include sauger, walleye, channel catfish and smallmouth bass. Migratory species from the Missouri River include shovelnose sturgeon, blue sucker, walleye, sauger and channel catfish. This reach contains sauger up to 22 inches, whitefish up to 17 inches, shovelnose sturgeon up to 43 inches, walleye up to 28 inches, channel catfish up to 31 inches, burbot up to 18 inches, and brown trout up to 16 inches in length. The maximum sizes of adult shovelnose sturgeon surpass most other known size data for the species and underscore the value of this high quality population. (Bd. Exh. 37-A.3, pp. 3-261 and 3-262.)

217. Blue sucker, smallmouth buffalo, bigmouth buffalo, and fresh water drum are the migratory species found in Reach #3 of the Marias River during their spawning seasons. They reside in the Missouri River during the rest of the year. There are also 16

nongame fish which are residents of Reach #3. (Bd. Exh. 37-A.3, p. 3-262.)

218. The central location of the warmwater fishery in Marias River Reach #3 makes it especially attractive for residents of the western part of the state, where trout fishing is the major activity. The lower six miles of this reach receive intensive angling pressure during the spring spawning season. Moderate angler use occurs during the rest of the year. (DFWP Exh. 36, Gardner Dir., p. 7; Bd. Exh. 37-A.3, p. 3-262.)

219. DFWP has requested instream flows on nine tributaries to the Marias River. These are: Birch Creek, South Fork Dupuyer Creek, North Fork Dupuyer Creek, Dupuyer Creek, South Badger Creek, North Badger Creek, Badger Creek, South Fork Two Medicine River and Cut Bank Creek. (Bd. Exh. 37-A.3, pp. 3-265 through 3-291.)

220. These nine Marias River tributary streams contain mixtures of brook, rainbow, westslope cutthroat trout and mountain whitefish. In addition to those species, Cut Bank Creek contains brown trout and burbot. (Bd. Exh. 37-A.3, pp. 3-265 through 3-291.)

221. South Fork Dupuyer, North Fork Dupuyer, South Badger, North Badger and Badger Creeks, and South Fork Two Medicine River all contain westslope cutthroat trout, a "Species of Special Concern" in Montana. Westslope cutthroat trout are found mostly in the headwaters of these tributary streams which arise on the east slope of the continental divide. Westslope cutthroat comprise 100% of the fish populations in these streams above natural barriers which prevent other species from mixing with these populations. (DFWP Exh. 35, Hill Dir., pp. 5 through 7; Bd. Exh. 37-A.3, pp. 3-267 through 3-288.)

222. Brook trout are the principal species in Birch Creek and Dupuyer Creek. Specimens up to one pound have been taken in Dupuyer Creek. These two streams also contain rainbow trout and whitefish. (DFWP Exh. 35, Hill Dir., pp. 5 and 6; Bd. Exh. 37-A.3, pp. 3-265, 3-266 and 3-275.)

223. Cut Bank Creek is an important fishery because it is the only trout stream readily available to persons in the Cut Bank area. Brown trout, introduced in 1965, have established a self-sustaining population. Catchable rainbow trout are stocked annually to supplement a few wild rainbow. (Bd. Exh. 37-A.3, p. 3-290.)

224. The Upper Teton River basin supports an abundance of fish and wildlife that provides good fishing and hunting. Native westslope cutthroat trout are found in headwater streams and rainbow, brook and brown trout occur in the middle to upper reaches of several streams. (Bd. Exh. 37-A.3, p. 3-294.)

225. DFWP has requested an instream flow in the Teton River only from its headwaters to the discharge from Priest Butte Lake near Choteau. Brook, brown and rainbow trout, and mountain whitefish are the principal game fish in this Reach, with the latter three providing a significant fishery in the lower portion of the reach. (DFWP Exh. 35, Hill Dir., p. 8; Bd. Exh. 37-A.3, p. 3-295.)

226. The Teton River provides a trout fishery for the people in the local area. Above Choteau, 90% of the fishery is small brook trout with fewer numbers of brown and rainbow trout and mountain whitefish. These are mostly pan-sized fish. (Bd. Exh. 37-A.3, p. 3-296.)

227. Below Choteau, the fishery is mostly brown trout, followed by whitefish and rainbow trout. Brown trout up to 22 inches, whitefish up to 21 inches and rainbow trout up to 18 inches in length have been taken in this Reach. (Bd. Exh. 37-A.3, pp. 3-296 and 3-297.)

228. DFWP has requested instream flows on five tributaries to the Teton River. These are: McDonald Creek, South Fork Deep Creek, North Fork Deep Creek, Deep Creek and Spring Creek. (Bd. Exh. 37-A.3, pp. 3-300 through 3-312.)

229. McDonald Creek provides a good fishery for small brook trout, the only game species present. South Fork Deep, North Fork Deep, Deep and Spring Creeks contain both brook and rainbow trout. Deep Creek also contains brown trout up to 14 inches in length, as well as whitefish. Westslope cutthroat trout are also found in South Fork Deep, North Fork Deep and Deep Creeks. (DFWP Exh. 35, Hill Dir., pp. 8 through 9; Bd. Exh. 37-A.3, pp. 3-300 through 3-312.)

230. Spring Creek is very important to the community of Choteau because it flows right through town. Annual plants of catchable rainbow trout are made within the town of Choteau for a children's fishing area. (DFWP Exh. 35, Hill Dir., p. 9.)

231. The Judith River is the third largest tributary to the Missouri River between Canyon Ferry Dam and Fort Peck Reservoir. It is a popular recreation area for fishing, hunting, picnicking, hiking and floating. (Bd. Exh. 37-A.3, pp. 3-315 and 3-316.)

232. Judith River Reach #1 (South and Middle Forks to Big Spring Creek) has a very good trout fishery that receives a considerable amount of angler use. Large brown trout are found in this Reach during the fall spawning season. Brown trout are the predominant game fish, followed by mountain whitefish and rainbow trout. An excellent population of brook trout exists in the upper portion of Reach #1. Low numbers of cutthroat trout also occur in

the upper portion of this Reach. (DFWP Exh. 36, Gardner Dir., p. 5; Bd. DFWP Exh. 37-A.3, p. 3-317.)

233. The upper portion of Judith River Reach #1 contains an estimated 1,420 trout per mile, which is an abundant fish population for streams typical of this area. Brook trout up to 13 inches, brown trout up to 20 inches, and rainbow trout up to 15 inches in length have been taken in this Reach. (Bd. Exh. 37-A.3, p. 3-317.)

234. Judith River Reach #2 (Big Spring Creek to its mouth) has a fair fishery for both warmwater and coldwater species. Present fish populations are not exceptionally high. (Bd. Exh. 37, A-3, p. 3-322.) It is an important spawning tributary for Missouri River channel catfish. Other game fish species present include sauger, mountain whitefish, brown trout, rainbow trout, smallmouth bass, walleye, cisco and burbot. (DFWP Exh. 36, Gardner Dir. p. 5; Bd. Exh. 37-A.3, p. 3-320.)

235. In Judith River Reach #2, sauger and channel catfish are the most abundant game fish. Sauger up to 24 inches and channel catfish up to 32 inches in length are present. Twelve nongame species also occur in this Reach. (Bd. Exh. 37-A.3, p. 3-320.)

236. The lower Judith River (Reach #2) has a diverse fishery which reflects the variety of habitat conditions present and the transition from a coldwater to a warmwater environment. This Reach receives only a light amount of fishing pressure, most likely due to its remote and fairly inaccessible location. (DFWP Exh. 36, Gardner Dir., p. 5; Bd. Exh. 37-A.3, p. 3-321.)

237. DFWP has requested instream flows on nine tributaries to the Judith River. These are: South Fork Judith River, Lost Fork Judith River, Middle Fork Judith River, Yogo Creek, Big Spring Creek, East Fork Big Spring Creek, Beaver Creek, Cottonwood Creek and Warm Spring Creek.

238. South Fork Judith, Lost Fork Judith, Middle Fork Judith and Yogo Creeks, all of which are headwater tributaries to the Judith River, contain very good to fair populations of pan-size rainbow, brook and cutthroat trout and mountain whitefish. Rainbow and brook trout are predominant. Middle Fork Judith River also contains a few brown trout. (DFWP Exh. 36, Gardner Dir., pp. 5 and 6; Bd. Exh. 37-A.3, pp. 3-324 through 3-338.)

239. South Fork Judith River receives a considerable amount of angler use, whereas Middle Fork, Lost Fork and Yogo Creeks receive moderate to light fishing pressure. (DFWP, Exh. 36, Gardner Dir., pp. 5 and 6; Bd. Exh. 37-A.3, pp. 3-324 through 3-338.)

240. Big Spring Creek is one of the largest spring-fed streams in the state. The majority of the flow originates from a large

spring located approximately nine miles southeast of Lewistown. The stream is high in dissolved solids, exceptionally productive and, for its size, rated as one of Montana's finest fishing waters. Local sportsmen and tourists consider the stream to be the most important trout stream in central Montana. (Bd. Exh. 37-A.3, pp. 3-341, 3-342 and 3-343.)

241. The productive nature of Big Spring Creek is due to stable year-round flows provided by the large spring; stable water temperatures in the mid-50's at the spring which provide optimum trout growth; productive water rich in dissolved solids from underground limestone formations which provide for good food production and fish growth; and the relatively stable banks, stream channel and well-developed riparian zone which provide trout habitat. (DFWP, Exh. 15, Poore Dir., p. 3.)

242. Big Spring Creek Reach #1 (from the state fish hatchery to Cottonwood Creek) contains primarily rainbow and brown trout with rainbow making up a majority of the population. A few brook trout and whitefish also occur. Up to 245 rainbow trout per mile 15 inches and longer, and up to 125 brown trout per mile 15 inches and longer, have been found in Big Spring Creek. Reach #1 has also produced many fish over 10 pounds and several between 18 and 20 pounds. (Bd. Exh. 37-A.3, pp. 3-343 and 3-344; DFWP Exh. 15, Poore Dir., p. 3.)

243. Big Spring Creek Reach #1 receives substantial angler use. Between 1982-86, an annual average of 11,000 angler-days of use occurred on this Reach. (Bd. Exh. 37-A.3, p. 3-344.)

244. Big Spring Creek Reach #2 (from Cottonwood Creek to the mouth) contains brown trout, rainbow trout, mountain whitefish and sauger. Whitefish are the most common salmonids, followed by rainbow and brown trout. Sauger are found in this Reach when they move in from the Judith River, probably to spawn. (Bd. Exh. 37-A.3, p. 3-347.)

245. Fishing pressure on Big Spring Creek Reach #2 is much less than Reach #1, but still substantial. An average annual use of 3,200 angler days occurred between 1982-86. (Bd. Exh. 37-A.3, p. 3-347.)

246. DFWP has requested instream flows on three tributaries to Big Spring Creek. These are: East Fork Big Spring Creek, Beaver Creek and Cottonwood Creek. (Bd. Exh. 37-A.3, pp. 3-350 through 3-360.)

247. These three Big Spring Creek tributaries contain pan-size rainbow, brook and brown trout. Rainbow are the predominant fish in the East Fork, brook trout in Beaver Creek and brown trout in Cottonwood Creek. Brown trout up to 17 inches and two pounds have been taken from Beaver Creek. All three streams have good to

moderate trout fisheries with moderate to light angler use. (DFWP Exh. 36, Gardner Dir., p. 5; Bd. Exh. 37-A.3, pp. 3-350 through 3-360.)

248. Warm Spring Creek flows directly into the Judith River. Because of its productivity and diversity of fish and invertebrate species, Warm Spring Creek is one of the most unique streams in the state. (DFWP Exh. 15, Poore Dir., p. 6.)

249. To some degree, the same factors which make Big Spring Creek so productive also apply to Warm Spring Creek: Stable stream flow, stable water temperatures, high dissolved solids and channel and bank stability. (DFWP Exh. 15, Poore Dir., pp. 6 and 7.)

250. Warm Spring Creek contains rainbow, brown and brook trout, smallmouth bass, sauger and channel catfish. Rainbow are the most abundant game fish. Brown trout are less abundant but Reach larger size (up to 20 inches and averaging 17 inches.) (Bd. Exh. 37-A.3, p. 3-363.)

251. Warm Spring Creek also contains smallmouth bass which are growing well and reproducing. Smallmouth bass were introduced because water temperatures are somewhat excessive for natural reproduction of rainbow and brown trout. The lower end of Warm Spring Creek also contains sauger and channel catfish which originate from the Judith River. (DFWP Exh. 15, Poore Dir., p. 6.)

252. Warm Spring Creek receives an average of 1,200 angler days per year. (Bd. Exh. 37-A.3, p. 3-364.)

253. Cow Creek is a northern tributary to the Missouri River. DFWP has requested flows on two miles of Cow Creek from the confluence of the North and South Forks to the county bridge near T.U. Reservoir. (Bd. Exh. 37-A.3, p. 3-367.)

254. Brook trout are the only game fish present in this Reach of Cow Creek. However, they occur in large numbers (4,187 fish per mile.) Brook trout are mostly pan-size but range up to 12 inches in length. (Bd. Exh. 37-A.3, pp. 3-367 and 3-368.)

255. This Reach of Cow Creek provides year-round habitat for brook trout as well as being the primary spawning areas for fish inhabiting downstream beaver ponds. Cow Creek has an excellent trout fishery and fishing pressure is light. (DFWP Exh. 36, Gardner Dir., p. 4; Bd. Exh. 37-A.3, p. 3-368.)

256. The Musselshell River is 364 miles long and is one of Montana's longest rivers. It is characterized by three fishery habitat types: 1) coldwater in the upper 55 miles; 2) coldwater/warmwater transitional zone for 146 miles; and 3) a classic warmwater prairie stream for 163 miles. Each Reach has

unique fishery qualities. (DFWP Exh. 27, Fredenberg Dir., pp. 2 and 3.)

257. Musselshell River Reach #1 (from the confluence of the North and South Forks to Deadmans Basin Diversion Dam) is a brown trout stream with abundant bank cover, deep pools and a dense riparian zone. Historically, when sufficient flows are present, Musselshell Reach #1 has provided large fish, with brown trout over five pounds not uncommon. Drought conditions between 1985 and 1988 produced a decline in the brown trout population. (DFWP Exh. 27, Fredenberg Dir., p. 3; Bd. Exh. 37-A.3, p. 3-376.)

258. Musselshell River Reach #2 (a 146-mile section from Deadmans Basin Diversion downstream to Musselshell Diversion) is a transitional zone between a coldwater and warmwater fishery. The trout fishery found in Reach #1 ends abruptly below Deadman's Diversion due to chronic dewatering and trout are, therefore, not a factor in the fishery of this Reach. (DFWP Exh. 27, Fredenberg Dir., p. 4.)

259. In Musselshell Reach #2, smallmouth bass are presently the most important game fish. A poor fishery exists throughout Reach #2 due to low water flows and poor water quality. (DFWP Exh. 27, Fredenberg Dir., p. 5; Bd. Exh. 37-A.3, p. 3-383.)

260. Musselshell Reach #2 contains a peculiar minnow, the northern redbelly dace x finescale dace hybrid, which is classified as a "Species of Special Concern" in Montana due to its limited numbers and habitat. This hybrid fish is a parthenogenetic species, which means that all of the individuals are female and they reproduce exact clones of the mother through development of an unfertilized egg. (DFWP Exh. 27, Fredenberg Dir., p. 5; Bd. Exh. 37-A.3, p. 3-383.)

261. Musselshell River Reach #3 extends for 163 miles from the Musselshell Diversion to its mouth at Fort Peck Reservoir. This Reach has significant fishery values and represents the free-flowing, warmwater portion of the Musselshell River. (DFWP Exh. 27, Fredenberg Dir., p. 5; Bd. Exh. 37-A.3, p. 3-386.)

262. Musselshell Reach #3 contains sauger, channel catfish, smallmouth bass, black bullhead, northern pike and walleye. This Reach is a very important spawning tributary for channel catfish, sauger and smallmouth bass from Fort Peck Reservoir because irrigation withdrawals are minimal and there are no barriers to upstream migration in this 163 miles of river. (DFWP Exh. 27, Fredenberg Dir., p. 6; Bd. Exh. 37-A.3, p. 3-387.)

263. Musselshell Reach #3, despite its remote location, had about 4,600 fisherman days of use in 1989. (DFWP Exh. 27, Fredenberg Dir., p. 6.)

264. DFWP requested instream flows on 11 tributaries to the Musselshell River. These are: South Fork Musselshell River, Alabaugh Creek, Cottonwood Creek, North Fork Musselshell River, Checkerboard Creek, Spring Creek, Big Elk Creek, American Fork Creek, Careless Creek, Swimming Woman Creek and Flatwillow Creek. (Bd. Exh. 37-A.3, pp. 3-390 through 3-436 and 3-440 through 3-443.)

265. All of the requested Musselshell River tributaries except Careless, Swimming Woman and Flatwillow Creeks are in Reach #1 of the Musselshell River. (Bd. Exh. 37-A.3, p. 3-372.)

266. South Fork Musselshell, Alabaugh Creek and Cottonwood Creek all contain rainbow, brook and brown trout. Brown trout are the dominant species in these three streams. All three streams provide good to excellent fisheries and produce some large fish. Brown trout up to 18 inches are present and specimens up to four pounds have been taken. (DFWP Exh. 26, Frazer Dir., pp. 4, 10 and 23; Bd. Exh. 37-A.3, pp. 3-390 through 3-402.)

267. North Fork Musselshell Reach #1 (above Bair Reservoir) contains an excellent pan-size brook trout population along with a few rainbow trout. Bair Reservoir is a barrier to all fish movement from downstream Reaches of the North Fork. (DFWP Exh. 26, Frazer Dir., p. 18; Bd. Exh. 37-A.3, pp. 3-406 through 3-412.)

268. Checkerboard Creek supports an excellent trout fishery comprised mostly of brook trout, with lesser numbers of rainbow and brown trout. Brook and rainbow trout over 12 inches long are present. Spring Creek is a good fishery for pan-sized brook and rainbow trout. Big Elk and American Fork Creeks provide good fisheries for brook and brown trout. Brook trout predominate in the upper reaches and brown trout in the lower reaches. Both streams contain brown trout up to 14 inches in length. Careless and Swimming Woman Creeks both contain brook trout and are important local fisheries. (DFWP Exh. 26, Frazer Dir., pp. 8 and 25; DFWP Exh. 27, Fredenberg Dir., pp. 7 and 8; Bd. Exh. 37-A.3, pp. 3-414, 3-418, 3-421 and 3-422, 3-425 and 3-426, 3-430, 3-433 and 3-434.)

269. Flatwillow Creek is the largest drainage emerging from the Snowy Mountains and, as such, is the best stream trout fishery in Petroleum County and surrounding locale. The stream contains brown, rainbow and brook trout. The mainstem of Flatwillow Creek above U.S. Highway 87 is a high quality trout stream that has regional importance. Brown trout are the predominant fish, followed by rainbow and brook trout. Brown trout up to 24 inches long have been taken from this stream Reach. (DFWP Exh. 27, Fredenberg Dir., p. 6; Bd. Exh. 37-A.3, pp. 3-441 and 3-442.)

270. Collar Gulch is a small tributary to Fords Creek which originates in the Judith Mountains about 12 miles northeast of Lewistown. This stream contains a small population of genetically

pure westslope cutthroat trout, a "Species of Special Concern" in Montana, which have survived in the isolated perennial headwaters of the stream for many years. Cutthroat up to 10 inches in length are present. (DFWP Exh. 15, Poore Dir., p. 8; Bd. Exh. 37-A.3, pp. 3-437 through 3-439.)

271. Big Dry and Little Dry Creeks are both low-gradient prairie streams. Little Dry Creek is a tributary to Big Dry Creek. Both streams contain channel catfish and walleye. Catfish are residents of the stream system and walleye are migratory species from Fort Peck Reservoir. Walleye are one of the most popular game fish in Fort Peck Reservoir. Walleye gather in the reservoir near the mouth of Big Dry Creek each spring and, if spring flows allow, they will migrate up Big Dry Creek 30 to 35 miles to spawn. They also migrate eight miles up Little Dry Creek to spawn. Walleye eggs, larvae and young-of-the-year fingerlings have all been collected in Big and Little Dry Creeks when high spring flows coincide with the normal walleye spawning period. Therefore, Big Dry and Little Dry Creeks are important spawning and rearing areas for walleye when flows are available. (DFWP Exh. 26, Frazer Dir., pp. 6, 7, 11 and 12; Bd. Exh. 37-A.3, pp. 3-445, 3-446, 3-448 and 3-449.)

272. Bean Lake is a natural lake located 15 miles southwest of Augusta in Lewis and Clark County. It is the only natural lake of any appreciable size in all of northcentral Montana. It is a popular recreation area and provides nearly 10,000 angler days of fishing per year. It is one of the few lakes and reservoirs which have public access and where the waters are not committed for other uses such as irrigation. Bean Lake has no surface water inflow; water supply is entirely from precipitation, ground water and seepage. It is an important rainbow trout fishery with a satisfactory catch rate and some older trout being taken in excess of four pounds. (DFWP Exh. 21, Wipperman Dir., pp. 5 and 6; Bd. Exh. 37-A.3, pp. 3-451 through 3-453.)

273. Antelope Butte Swamp is part of the Blackleaf Wildlife Management Area lying approximately 14 miles west of Bynum in Teton County. The swamp is a perennial wetland area of approximately 240 acres, which is fed by Noname Creek and a private diversion from Muddy Creek. The area is managed by DFWP as a winter range for migratory wildlife such as elk and mule deer. It has a diversity of plant communities which provide year-round and seasonal habitats for whitetail and mule deer, elk, black and grizzly bear, wolf, (both grizzly and wolf are federally protected threatened and endangered species), mountain lion, bobcat, lynx, beaver, mink, muskrat, sharptailed, ruffed, spruce and blue grouse, as well as numerous waterfowl species. Grizzly bears in particular are drawn to the area during the spring to feed on succulent plants that grow in the moist environment of the Swamp. As part of the Blackleaf Wildlife Management Area, the Swamp provides the needs for both game and nongame wildlife and a resource that is available for the

recreational enjoyment by the public. (DFWP Exh. 16, Olson Dir., pp. 2 and 3; Bd. Exh. 37-A.3, pp. 3-455 through 3-459.)

274. Fish "Species of Special Concern" which occur in Missouri basin streams above Fort Peck Dam include the following species:

Westslope cutthroat trout
Arctic grayling
Pallid sturgeon
Sturgeon chub
Paddlefish
Northern redbelly dace x finescale dace hybrid
Sickelfin chub
Blue sucker

275. "Species of Special Concern" is a DFWP and American Fisheries Society designation that reflects the limited numbers of these fish present in the state, their limited distribution or the limited amount of preferred habitat still available to them. These fish have been eliminated or severely reduced in numbers over much of their former range. (DFWP Exh. 17, Spence Dir., p. 11.)

276. The westslope cutthroat trout, a "Species of Special Concern", is native to Montana west of the Continental Divide and to the Missouri River and its tributaries in the mountains east of the Continental Divide. The Montana Natural Heritage Program (MNHP) lists genetically pure westslope cutthroat as rare in Montana. It is estimated that genetically pure westslope cutthroat occupy only 1.1% of their historical range in Montana streams. The decline of westslope cutthroat trout may be due to several factors, including hybridization with non-native rainbow trout, competition from introduced species, over-fishing and habitat alteration. (Bd. Exh. 40, p. 89; DFWP Exh. 35, Hill Dir., p. 4; Bd. Exh. 37-A.2, p. 2-10.)

277. The status of fluvial (permanently stream dwelling) arctic grayling, Thymallus arcticus, in Montana has been of increasing concern in recent years. Stream populations of this indigenous fish, which is an important component of the sport fishery of Montana, have declined severely. (MTU/AFS Exh. 10, Kaya Dir., p. 2.)

278. The U.S. Fish and Wildlife Service (USFWS) classifies fluvial Montana grayling as a category 1 species, the final category before listing as threatened or endangered. On October 3, 1991, USFWS received a petition from private foundations to list the stream-dwelling grayling as an endangered species throughout its known historical range in the lower 48 states. (MTU/AFS Exh. 10, Kaya Dir., p. 4; Bd. Exh. 41, p. 32.)

279. The arctic grayling was native to two areas in the lower 48 states: Michigan, where it is now extinct, and in the Missouri

River drainage above Great Falls, where it was once abundant. Once widely distributed in the Missouri River and its tributaries upstream from Great Falls, fluvial Montana grayling are now restricted to the upper reaches of a single tributary, the Big Hole River. This is the only confirmed fluvial grayling population still remaining south of Canada and Alaska. Lake dwelling grayling are abundant and secure in Montana in lakes in which they have been planted. (MTU/AFS Exh. 10, Kaya Dir., p. 2; Bd. Exh. 40, p. 89; Bd. Exh. 37-A.2, p. 2-10.)

280. There is some evidence that suggests that a grayling population that resides in Ennis Lake and moves back and forth between the Madison River channels and Ennis Lake may be another remnant of this same fluvial population. (Fredenberg Cross, Tr. Day 12, pp. 116, 117 and 122.)

281. Fluvial Montana grayling are reduced in distribution to only about 8% or less of their historical range. The Michigan grayling underwent a similar earlier decline and disappeared about 1936. Repeated attempts to establish or restore stream populations in Michigan and Montana have not succeeded. (MTU/AFS Exh. 10, Kaya Dir., p. 2.)

282. The total estimated size of the current fluvial grayling population in the 50 miles of the Big Hole River where they live is approximately 1,500 grayling one year old or older. (MTU/AFS Exh. 10, Kaya Dir., p. 4.)

283. Some Montana streams contain more than 1,500 age one or older trout per single mile. (MTU/AFS Exh. 10, Kaya Dir., p. 4.)

284. The cause of decline in stream-dwelling arctic grayling populations is not well understood but is believed to be identified with low stream flows, changes in land use, over-harvest and competition from introduced non-native species. (MTU/AFS Exh. 10, Kaya Dir., pp. 4 and 5; Bd. Exh. 40, p. 89; Bd. Exh. 37-A.2, p. 2-10; Kaya Cross, Tr. Day 13, p. 78.)

285. Degradation of fluvial grayling habitat in Montana appears most frequently to have been related directly or indirectly to agricultural irrigation. The most important disturbances have been reduction in streamflows through withdrawals of water for irrigation, blockage of streams by dams for reservoirs and diversions, and flooding of streams by reservoirs. (MTU/AFS Exh. 10, Kaya Dir., p. 5.)

286. One of the main requirements for a healthier and more productive grayling population in the Big Hole River drainage is adequate flow, ie., more water means more fish. (Kaya Cross, Tr. Day 13, p. 83.)

287. Among the factors most commonly cited as being detrimental to Big Hole River grayling is low streamflows. In addition to this reduction in habitat for grayling of all ages, other possible effects of low streamflows include interference with seasonal migrations, stranding of incubating eggs or young fish, increased predation on young fish through their being concentrated in remnant waters with adults and other fishes, reduced food availability through habitat reduction for aquatic invertebrates, and increased maximum daily temperatures. (MTU/AFS Exh. 10, Kaya Dir., pp. 6 and 7.)

288. Weak year classes of grayling are associated with lower flows and strong year classes with flows normal or slightly above average. During years of low flow, many adults move downstream after spawning instead of remaining in upstream areas through the summer, suggesting that low flows may be altering their migration patterns by making them leave their summer feeding areas. (MTU/AFS Exh. 10, Kaya Dir., p. 7.)

289. Grayling populations in the Big Hole River are higher during years when flows are higher and lower during low flow years. (Kaya Re-cross, Tr. Day 13, pp. 100 through 102.)

290. Water withdrawals from the Big Hole River may be contributing to elevated water temperatures during the summer through a relationship between reduced flows and increased stream temperatures. (MTU/AFS Exh. 10, Kaya Dir., pp. 7 and 8.)

291. Restrictive fishing regulations since 1984 have not improved the Big Hole River grayling population. (Kaya Cross, Tr. Day 13, p. 85.)

292. Since fishing harvest of grayling is now severely restricted by present catch and release fishing regulations, maintenance of adequate water flows may be the most critical requirement for the continued existence of the severely depressed population of fluvial grayling in the upper Big Hole River. (MTU/AFS Exh. 10, Kaya Dir., p. 8.)

293. The pallid sturgeon, Scaphirhynchus albus, is one of the two sturgeons in the genus Scaphirhynchus found in North America. The other species is the more common shovelnose sturgeon (S. platorynchus. Pallid sturgeon are one of the largest fish found in the Missouri River, with specimens approaching 6 feet and 85 pounds. (MTU/AFS Exh. 5, Dryer Dir., p. 1.)

294. The original distribution of the pallid sturgeon included the Mississippi River and large tributaries from Iowa to Louisiana, the Missouri River from Great Falls to the mouth, and the Yellowstone River below the mouth of the Tongue River. (Bd. Exh. 40, p. 88.)

295. Sturgeon are ancient fish which have survived and remained relatively unchanged for over 200 million years. The pallid sturgeon is now on the brink of extinction. Possible contributing factors to the decline of the species includes channelization and damming of rivers which has greatly reduced the migratory range of the fish, operation of the dams which alter water quality and flows, overfishing and environmental contaminants. (MTU/AFS Exh. 5, Dryer Dir., p. 3; Bd. Exh. 40, DEIS, p. 88.)

296. In October 1990, the pallid sturgeon was listed as an endangered species throughout its entire range. This designation means that the species is in danger of extinction throughout all or a significant portion of its range. (MTU/AFS Exh. 5, Dryer Dir., pp. 2 and 3.)

297. The pallid sturgeon's unique position in the Missouri River aquatic ecosystem has already been severely affected, especially as one moves further and further downstream of Montana. The Missouri River above Fort Peck Reservoir is the least altered of the entire 2,000+ mile Missouri and Mississippi River mainstem systems which encompass the range of the pallid sturgeon. Maintaining the natural Missouri River ecosystem in Montana in its current state is important to recovery of the pallid sturgeon. (MTU/AFS Exh. 5, Dryer Dir., p. 4.)

298. During the 1960's, 500 observations of pallid sturgeon were made over its entire range. By contrast, throughout the 1980's there were only 65 recorded observations of pallid sturgeon over its entire range. Since 1980, only seven pallid sturgeon have been recorded in the Missouri River above Fort Peck Reservoir in Montana. (MTU/AFS Exh. 5, Dryer Dir., p. 3.)

299. Pallid sturgeon are long-lived fish achieving ages of more than 40 years. The time required to reach sexual maturity for males is seven to nine years with a 2-3 year interval between spawning years. Females reach sexual maturity in 15-20 years with 3-10 year intervals between spawning. (MTU/AFS Exh. 5, Dryer Dir., p. 2.)

300. The sturgeon chub is a member of the minnow family and is not a game fish. This fish lives in medium to large rivers that are turbid and warm, in areas of strong current with a sand or gravel bottom. It grows to be about four inches long. The sturgeon chub is a candidate for listing as an endangered and threatened species. (Bd. Exh. 40, p. 89; MTU/AFS Exh. 5, Dryer Dir., p. 4.)

301. Paddlefish are Montana's largest game fish with female specimens often reaching five to six feet in length and weighing 75 to 125 pounds. Once abundant 150 million years ago, these primitive fish are presently found in only two river basins -- the

Yangtze in China and the Mississippi/Missouri. (Bd. Exh. 37-A.1, p. 1-40.)

302. The paddlefish is not listed as an endangered species but it is a "Species of Special Concern" in Montana. (DFWP Exh. 29, Berg Dir., p. 3.)

303. Stream channelization, dams, overharvesting and alteration of streamflows have reduced the range of paddlefish in the United States to only six isolated self-sustaining populations in the Mississippi/Missouri basins. The paddlefish population in Fort Peck Reservoir and the Missouri River above the reservoir is the oldest and most secure of all the North America populations. Growth rates of this population are also better than any of the other five populations. This is due largely to the unaltered free-flowing characteristics of this Reach of the river which provides essential and irreplaceable spawning areas for paddlefish. (Bd. Exh. 37-A.1, pp. 1-40 and 1-41.)

304. The northern redbelly dace x finescale dace is a hybrid fish which is produced when northern redbelly dace are crossed with finescale dace. The hybrid is a parthenogenetic species, which means that all of the individuals are female and they produce exact clones of the mother through development of an unfertilized egg. This peculiar minnow has been found in three locations in the Missouri River basin above Fort Peck Dam and in the Musselshell River. (Bd. Exh. 40, p. 89; DFWP Exh. 27, Fredenberg Dir., p. 5.)

305. The Montana Natural Heritage Program (MNHP) notes that the sickelfin chub is critically imperiled in Montana and rare throughout the rest of its range. The sickelfin chub is a member of the minnow family and may grow to 3.5 inches in length. It has been found along the lower portion of the Missouri River above Fort Peck Reservoir. The sickelfin chub is a candidate for listing as a federal endangered or threatened species. (Bd. Exh. 40, p. 89; MTU/AFS Exh. 5, Dryer Dir., p. 4.)

306. The blue sucker is rare in Montana. It has been found in the Missouri River below Fort Benton, Marias River, the lower Judith River and the lower portion of the Yellowstone River. The blue sucker is not a game fish in Montana. The state record weight for a blue sucker is 11.5 pounds. The blue sucker is a candidate for listing as a federal endangered or threatened species. (Bd. Exh. 41, p. 143; MTU/AFS Exh. 5, Dryer Dir., p. 4.)

307. Riparian communities are the plants and animals associated with stream courses and floodplains. From a wildlife standpoint, the habitat diversity provided by riparian vegetation is perhaps the greatest value provided by flowing water. (DFWP Exh. 28, Casey Dir., p. 2.)

308. Riparian soils are often geomorphically very young and coarse textured and, therefore, transmit water readily and have a low water retention capacity. Therefore, a dependable water supply is essential to assure that riparian soils will serve as growth media for woody vegetation. (DFWP Exh. 28, Casey Dir., p. 3.)

309. Decreased flow can result in decreased riparian cover because of induced soil moisture stress. Also, providing more consistent flows in intermittent or ephemeral streams has been shown to increase riparian vegetation. Light to moderate flooding also favors establishment and regeneration of riparian communities and some species such as willows and cottonwoods are dependent on seasonal flooding for perpetuation of multi-aged stands. (DFWP Exh. 28, Casey Dir., p. 3.)

310. The importance of riparian habitats to wildlife has been well documented in the scientific literature and their importance in the arid west is well accepted by the scientific community. (DFWP Exh. 28, Casey Dir., p. 3.)

311. Because of their biological importance and because of documented losses of riparian acreage through conversion to agriculture and other land uses, maintenance of riparian habitats is important wildlife across Montana and elsewhere in the west. (DFWP Exh. 28, Casey Dir., p. 3.)

312. Wooded riparian areas have been shown throughout the west to support higher densities of breeding birds than any other habitats. Breeding bird communities are frequently used as a "barometer" of habitat richness and health because they are relatively easy to measure and respond quickly and dramatically to environmental changes. (DFWP Exh. 28, Casey Dir., p. 3.)

313. The relationship between diversity of breeding birds and riparian habitats has been documented. Cottonwood communities in the Missouri River breaks supported more than 2-5 times as many breeding pairs and twice the species of birds as did the upland habitats investigated (upland habitats specifically were greasewood-sagebrush, sagebrush-grassland, and pine-juniper). (DFWP Exh. 28, Casey Dir., p. 4.)

314. Many big game species which feed in a variety of habitats, including agricultural lands, are dependent on wooded riparian habitat for security and thermal cover during critical times of the year. Many wildlife species are found almost exclusively in riparian habitats. These include numerous songbird species, waterfowl, ospreys and bald eagles, beavers, river otters, and mink. (DFWP Exh. 28, Casey Dir., p. 4.)

315. Mature stands of cottonwood and younger stands of willow/cottonwood on islands are two important nesting habitats for Canada geese. (DFWP Exh. 28, Casey Dir., p. 4.)

316. The importance of riparian habitat to specific wildlife species has been quantified. (DFWP Exh. 28, Casey Dir., p. 4.)

317. The biological abundance and diversity found within riparian areas attracts increasing numbers of persons who recreate along streams, including photographers, bird watchers, science students, hunters, berry pickers and naturalists. (Bd. Exh. 37-A.1, p. 1-45.)

318. Preserving instream flows will help maintain the health and vigor of riparian plant species through the protection of water (either surface or subsurface) during critical periods in their growth cycle.

319. Although the number of species varies from stream to stream, all of the streams where DFWP has requested flows for fishery purposes also harbor a wide diversity of wildlife species. (Bd. Exh. 37-A.2, pp. 2-8 through 2-615; Bd. Exh. 37-A.3, pp. 3-1 through 3-459.)

320. In addition to those numerous wildlife species occurring along the stream corridors, a number of threatened and endangered wildlife species occur in some stream reaches.

321. The bald eagle occurs year-round in the upper Missouri basin and is federally classified as an endangered species. From 30-50 eagles winter on area reservoirs and rivers. Winter densities are typically highest in the area of Ennis Reservoir on the Madison River and along the headwaters of the Missouri River near Three Forks, where 12-15 eagles may be present at each location. Bald eagles commonly pass through the upper basin during fall and spring migrations. The Missouri River basin between Canyon Ferry Dam and Fort Peck Reservoir also provides important habitat for bald eagles. Three active bald eagle nesting sites have been identified along the Missouri River corridor between Hauser Lake and Great Falls. (Bd. Exh. 37-A.2, p. 2-9; Bd. Exh. 37-A.3, p. 3-5.)

322. The peregrine falcon is an endangered species and occurs as a casual migrant in the upper Missouri River basin in spring and fall. Following recent efforts to reintroduce peregrines to their former breeding range in the upper basin, three breeding pairs are presently established and more are anticipated in the near future. The Missouri River basin between Canyon Ferry Dam and Fort Peck Reservoir also provides important habitat for peregrine falcons. Two active peregrine nesting sites have been identified along the River corridor between Hauser Lake and Great Falls and attempts are underway to reintroduce peregrine falcons along this stretch of the River. (Bd. Exh. 37-A.2, p. 2-9; Bd. Exh. 37-A.3, p. 3-5.)

323. The whooping crane is a federally designated endangered species and occurs primarily in the Redrock Lakes National Wildlife

Refuge in Montana. (Bd. Exh. 37-A.2, p. 2-9.)

324. Grizzly bears designated as threatened by the federal government use the mountain wildlands of the Madison, Gallatin and Ruby river drainages year long for winter denning, feeding and day-bedding and as a travel corridor. In the lower Missouri basin, grizzly bears also inhabit the headwater streams and foothills along the east slope of the Continental Divide, including streams in the Marias and Teton River sub-basins. The grizzly bear utilizes many of these areas during the spring, summer and fall. (Bd. Exh. 37-A.2, pp. 2-9 and 2-10; DFWP Exh. 35, Hill Dir., pp. 4 through 9.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY DFWP (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

325. The instream flows requested by DFWP are intended to maintain fishery values. Several methods were used to determine the requested amounts of water. (Bd. Exh. 37-A.1, p. 1-11.)

326. Positive relationships between fish abundance and the magnitude of a stream's annual low flows are well documented in the scientific literature. Higher flows generally lead to a greater abundance of fish. (DFWP Exh. 23, p. 7; MTU/AFS Exh. 9, White Dir., p.2.)

327. The best and most accurate means for deriving minimum flow requests to protect fishery values is to directly observe the response of the fish populations to flow variations over a period of many years. Because of the intensive data requirements and long-term commitment, this approach is impractical for a water reservation process, requiring the use of an array of less time-consuming and more practical alternatives. (DFWP Exh. 22, Nelson Dir., p. 4; MTU/AFS Exh. 8, Thomas Dir., p. 3.)

328. These alternative instream techniques are designed to determine how much water a stream needs to protect aquatic life, and are divided into three general groups of methods: 1) non-field, 2) incremental, and 3) habitat retention. (DFWP Exh. 22, Nelson Dir., p. 4; MTU/AFS Exh. 8, Thomas Dir., p. 3.)

329. Because non-field methods are usually performed in the office and are commonly based on a flow quantity derived from the historic flow record, they are normally confined to deriving preliminary recommendations. This limits their suitability for use in this process. (DFWP Exh. 22, Nelson Dir., p. 4; Nelson Cross, Tr. Day 8, p. 128.)

330. Incremental methods attempt to predict the actual amount of suitable fish habitat that is present as flow changes incrementally. They provide a means for measuring trade-offs as

opposed to providing minimum flow recommendations. This method is costly, complex and time-consuming and has limited application to a water reservation process. (DFWP Exh. 22, Nelson Dir., p. 5 and DFWP Exh. 44, Nelson Reb., pp. 2 through 4 and Attachment B, p. 180; Nelson Cross, Tr. Day 8, pp. 135, 136, 138, 139, 140, 141 and 232; MTU/AFS Exh. 8, Thomas Dir., p. 4.)

331. Habitat retention methods examine various components of a stream's hydraulic characteristics at various flows for the purpose of developing generalized habitat-flow relationships. The outcome is a minimum flow recommendation that is intended to fully protect some aspect of the stream resource. These methods, also termed standard-setting methods, are most appropriate for a water reservation process. (DFWP Exh. 22, Nelson Dir., p. 5; DFWP Exh. 44, Nelson Reb., p. 3 and Attachment B, p. 180; MTU/AFS Exh. 8, Thomas Dir., p. 4.)

332. At the present time no existing instream flow method can quantitatively predict the response of a stream's fish community to incremental changes in flow. These relationships are solely the product of stream-specific, long-term, biological studies. (DFWP Exh. 22, Nelson Dir., pp. 12 and 13.)

333. The Wetted Perimeter Method was chosen by DFWP to derive minimum instream flow requests for the majority of streams in DFWP's application. (Bd. Exh. 37-A.1, p. 1-18.)

334. The Wetted Perimeter Method originated in Washington and Idaho in the early-1970's. (DFWP Exh. 22, Nelson Dir., pp. 5 and 6 and DFWP Exh. 24, p. 4.)

335. Wetted perimeter is a well recognized and commonly used habitat retention minimum flow method, particularly in the Pacific Northwest and Rocky Mountain region of North America. (DFWP Exh. 44, Nelson Reb., pp. 1 and 2 and Attachment A, pp. 23 through 27; MTU/AFS Exh. 9, White Dir. p. 3; MTU/AFS Exh. 8, Thomas Dir., p. 3.)

336. Biological studies by DFWP and Montana State University support the validity of the minimum flow recommendations generated by the Wetted Perimeter Method. (Nelson Cross, Tr. Day 9, pp. 96 through 98; MTU/AFS Exh. 9, White Dir., p. 2.)

337. Wetted perimeter is the distance along the bottom and sides of a channel cross-section that is in contact with water when the stream is viewed in cross-section. (DFWP Exh. 22, Nelson Dir., p. 6 and Attachment B.)

338. The relationship between wetted perimeter and flow for stream riffles generally, but not always, shows two inflection points where the rate of increase of wetted perimeter changes. Below the lower inflection point, flow is spreading out

horizontally across the stream bottom, causing the wetted perimeter to increase rapidly for very small increases in flow. A point is eventually reached (at the lower inflection point) where the water starts to move up the sides of the active channel and the rate of increase of wetted perimeter begins to decline. At the upper inflection point, the stream is approaching its maximum width and begins to move up the banks as flow increases. Large increases in flow beyond the upper inflection point cause only small increases in wetted perimeter. (DFWP Exh. 22, Nelson Dir., p. 7 and Attachments C and D.)

339. The relationship between wetted perimeter and flow is derived for stream riffles. A riffle is a section of stream in which the water flow is rapid and shallower than the sections above and below. It has a substratum of gravel and rubble and is a very distinct habitat type that can be readily distinguished visually by an on-site inspection. Streams usually consist of a succession of pools and riffles. (DFWP Exh. 22, Nelson Dir., p. 6; Nelson Redirect, Tr. Day 9, p. 100.)

340. Riffles are the primary stream habitat where aquatic invertebrates, the main food of Montana's stream-dwelling game fish, are produced. (DFWP Exh. 22, Nelson Dir., pp. 6 and 7.)

341. Food supply is a major factor influencing the abundance of game fish in Montana's streams. (DFWP Exh. 22, Nelson Dir., p. 11 and DFWP Exh. 23, pp. 10 through 12.)

342. The underlying assumption of the wetted perimeter methodology is that food becomes limiting as flow associated reductions in wetted perimeter occur. This is a very reasonable assumption since many stream fish species rely on aquatic invertebrates as their primary food source and the primary food production area is in riffles. (MTU/AFS Exh. 9, White Dir., p. 3.)

343. As riffle areas are dewatered, food production is assumed to be reduced, resulting in a decrease in the carrying capacity of the stream. (MTU/AFS Exh. 9, White Dir., p. 3.)

344. Aquatic invertebrates - gill-breathing organisms that inhabit the small spaces within the riffle bottom - require a cover of flowing water to supply life-sustaining oxygen. (DFWP Exh. 22, Nelson Dir., p. 7.)

345. The Wetted Perimeter Method provides the minimum streamflow that will cover most of a stream's riffle area with water. This is the upper inflection point flow. (DFWP Exh. 22, Nelson Dir., pp. 6 and 7.)

346. Biological assumptions are a prominent component of all instream flow methods, including the Wetted Perimeter Method.

(DFWP Exh. 22, Nelson Dir., pp. 10 and 11; MTU/AFS Exh. 9, White Dir., p. 3.)

347. The upper inflection point flow is derived from the plot of the relationship between wetted perimeter and flow for the stream riffles of interest. These plots are generated using DFWP's wetted perimeter computer program, which is calibrated using surveyed channel measurements that are taken at different flows for each stream of interest. (DFWP Exh. 22, Nelson Dir., pp. 9 and 10.)

348. A number of checks were used by DFWP in developing and analyzing wetted perimeter information so that the results would be as reliable and accurate as possible. (Nelson Cross, Tr. Day 9, pp. 104, 105, 106, 107, 124 and 125.)

349. Wetted perimeter field data, used to calibrate the wetted perimeter computer program, were collected by a team of DFWP personnel, usually consisting of a team leader - typically a biologist - and two or more field workers. Approximately 12 teams collected the wetted perimeter data presented in DFWP's application. (DFWP Exh. 22, Nelson Dir., p. 10.)

350. DFWP personnel were trained in the use of the Wetted Perimeter Method at workshops conducted by DFWP, often in conjunction with the United States Geological Survey. Training included: theory of the Wetted Perimeter Method, surveying and field techniques, selection of study sites, data coding, flow measuring procedures, and field exercises. (DFWP Exh. 22, Nelson Dir., pp. 2 and 10; Nelson Cross, Tr. Day 12, p. 230; Frazer Cross, Tr. Day 9, pp. 156, 157, 168.)

351. Application of the Wetted Perimeter Method by DFWP's field personnel was governed by procedures and standards set forth in DFWP's 1980 publication titled "Guidelines for Using the Wetted Perimeter (WETP) Computer Program of the Montana Department of Fish, Wildlife and Parks", which was updated in 1985 and 1989. (DFWP Exh. 24, pp. 1 through 28 and A-1 through C-19; and DFWP Exh. 22, Nelson Dir., p. 2.)

352. In 1985, at the suggestion of the USFWS Instream Flow Service Group, the stage at zero flow was incorporated into DFWP's wetted perimeter computer program. This addition improved the accuracy of the wetted perimeter predictions for flows that are less than the lowest calibration flows measured in the field. The wetted perimeter information presented in DFWP's application reflects this 1985 modification. (DFWP Exh. 24, pp. 8 and 9; Nelson Cross, Tr. Day 9, p. 112; Nelson Cross, Tr. Day 8, pp. 119 and 120; Nelson Cross, Tr. Day 5, p. 82; Nelson Cross, Tr. Day 5, pp. 92 and 93.)

353. When using the Wetted Perimeter Method, there are no benefits from incorporating depth and velocity parameters. (Nelson Cross, Tr. Day 9, p. 99.)

354. There are no instream flow methods that establish confidence levels around the flow predictions. (Nelson Cross, Tr. Day 9, pp. 103 and 104.)

355. At the upper inflection point flow, a stream's food-producing potential is near maximum because most of the riffle habitat is covered with water. Maintaining near maximum food-producing potential will, in turn, benefit game fish populations. (DFWP Exh. 22, Nelson Dir., p. 12 and DFWP Exh. 23, pp. 11 and 12; MTU/AFS Exh. 9, White Dir., p. 3.)

356. Riffles are also used by many game fish species for spawning and for the rearing of their young. Flow requests that protect the food-producing capacity of riffles will also help to protect the fishes' spawning and rearing areas. (DFWP Exh. 23, p. 53.)

357. Riffles are areas of streams that are most sensitive to flow reductions. Therefore, a flow request that wets most of the riffle area will, at the same time, help to protect a stream's pools and runs - areas where adult fish normally reside. (DFWP Exh. 23, p. 53.)

358. Generally, the instream flows requested by DFWP are intended to maintain fishery values. (Nelson Cross, Tr. Day 13, p. 18.)

359. Flow requests based on the Wetted Perimeter Method apply to the non-winter period from approximately April through October. This is the period when fish grow and feed intensively and are being recruited into the population. Food supply appears to be a major limiting factor during this period. Fish food diversity and abundance are related to trout standing crops. Adequate summer flows are critical to preserving aquatic life. (DFWP Exh. 22, Nelson Dir., p. 15; Nelson Cross, Tr. Day 8, pp. 121, 122; MTU/AFS Exh. 8, Thomas Dir., p. 7.)

360. The limiting factor that regulates fish populations during the winter is fish habitat. The policy of DFWP when deriving flow requests for winter (approximately November through March) is to fully protect winter flows. This is based on the fact that winter is the most critical period influencing game fish densities in undepleted streams. Also, in winter, stream flows are typically at their annual lows in Montana's undepleted streams. (DFWP Exh. 22, Nelson Dir., pp. 15 and 16; DFWP Exh. 45, Nelson Reb., p. 7; Nelson Cross, Tr. Day 12, p. 195; Nelson Cross, Tr. Day 8, pp. 121, 122.)

361. Upper inflection point flow requests derived from the Wetted Perimeter Method typically exceed base winter flows. Winter flows would, therefore, be fully protected if upper inflection point requests were extended through the winter. In DFWP's application, requests based on the Wetted Perimeter Method were, for the majority of streams, extended through winter. (DFWP Exh. 23, pp. 59 and 60.)

362. Some inflection points can be poorly defined and difficult to identify. In Montana, the Wetted Perimeter Method has been primarily applied to fairly high gradient mountain streams that contain well-defined riffles having rectangular cross-sectional profiles. Due to this riffle configuration, inflection points, particularly upper ones, are readily discernible for the majority of streams. However, exceptions do occur and require some level of professional judgment in identifying inflection points. (DFWP Exh. 22, Nelson Dir., p. 13.)

363. Professional judgment, which plays a role in formulating flow recommendations with all instream flow methods, including the Wetted Perimeter Method, is an accepted and often desired component of instream flow methods. (DFWP Exh. 22, Nelson Dir., pp. 13 and 14; DFWP Exh. 44, Nelson Reb., Attachment A, p. 27; Nelson Cross, Tr. Day 9, p. 120; MTU/AFS Exh. 8, Thomas Dir., p. 5.)

364. Inflection point determinations were made by biologists who were instructed to use all the resources they had available in coming to that determination. These resources included their own visual observations of the stream, photographs they took of the stream and the knowledge they gained by being on the stream -- all used in conjunction with the graphical relationship of wetted perimeter and flow that was generated for each stream. (Nelson Cross, Tr. Day 12, p. 230.)

365. Flows at the upper inflection point are needed to provide minimum instream flow protection for those streams having the more significant fishery values. These include streams that have national, regional or local importance as sport fisheries; streams that support significant numbers of game fish for their stream type and size; streams that support "Species of Special Concern" (westslope cutthroat trout and arctic grayling, for example); and streams that provide crucial reproductive habitats for reservoir, lake or mainstem river populations of game fish. (DFWP Exh. 22, Nelson Dir., pp. 8 and 9 and DFWP Exh. 47, Hill Reb., p. 1.)

366. The purpose of a high inflection point flow recommendation is to provide a flow that would wet much of the riffle wetted perimeter. Flows which occur up to that point will be beneficial to the fish because of their impact on riffle food production. Flows above the upper inflection point will still be beneficial but will have less benefit than flows up to the high inflection point. (Nelson Cross, Tr. Day 13, pp. 7 and 8.)

367. The Wetted Perimeter Method does not incorporate existing water availability into the method. The method generates a minimum flow recommendation and that recommendation is not adjusted to reflect what the historic low flow event is. The instream flow recommendation is not downgraded to equal the historic low flow event. (Nelson Cross, Tr. Day 13, pp. 9 and 10.)

368. The U.S. Fish and Wildlife Service's Instream Flow Group has been involved for many years in the application and development of instream flow methods. Procedures such as the WETP method used by DFWP are appropriate for protecting the existing instream resource for purposes of state water plans and state water allocations such as permits or reservations, and for identifying target flows for use during project feasibility studies. (Bd. Exh. 41, p. C-10; Trihey and Stalnaker (1985), Bd. Exh. 41, p. R-9.)

369. More advanced incremental methods such as the instream flow group's Instream Flow Incremental Method (IFIM), are most appropriate for time series analysis to identify limiting flow conditions, fine tuning a resource maintenance objective (maximum utilization of available water), avoiding or minimizing flow-related impacts for specific projects and comparing mitigation alternatives. (Bd. Exh. 41, p. C-10.)

370. The upper inflection point flow requests, when averaged for all streams, equal about 40% of the average annual flow. (Bd. Exh. 41, p. 85; Bd. Exh. 37-A.1, p. 1-20; Nelson Cross, Tr. Day 12, p. 204.)

371. The fishery biologists who derived the instream flow requests using the Wetted Perimeter Method had the option of requesting a flow lower than the upper inflection point if, based on their professional evaluation of the stream resource, a lower flow request was sufficient to provide minimum instream flow protection. The lower inflection point flow was requested in the DFWP application to attain streams having the less significant fishery resource values. (DFWP Exh. 22, Nelson Dir., pp. 7 through 9.)

372. Instream flow requests at the lower inflection point or between the lower and upper inflection points were made for the following 24 stream Reaches. (Bd. Exh. 37-A.2, pp. 2-1 through 2-620 and Bd. Exh. 37-A.3, pp. 3-1 through 3-464):

<u>Red Rock-Beaverhead R. Sub-basin</u>
Blacktail Deer Creek

<u>Ruby River Sub-basin</u>
Ruby River (Reach #1)
Middle Fork Ruby River

<u>Little Prickly Pear Cr. Sub-basi</u>
Virginia Creek

<u>Dearborn River Sub-basin</u>
Flat Creek

East Fork Ruby River
West Fork Ruby River
Cottonwood Creek

Big Hole River Sub-basin
Pattengail Creek
Birch Creek

Jefferson River Sub-basin
Boulder River (Reach #3)

Gallatin River Sub-basin
Porcupine Creek
Middle Fork of the West Fork Gallatin River
South Fork of the West Fork Gallatin River
Big Bear Creek
Hyalite (Middle) Creek - Reach #2

Smith River Sub-basin
Smith River - Reach #3

Sun River Sub-basin
Sun River - Reach #1
Sun River - Reach #2

Belt Creek Sub-basin
Belt Creek - Reach #2

Judith River Sub-basin
Judith River - Reach #2
Cottonwood Creek

Musselshell River Sub-basin
Musselshell River - Reach #1
Musselshell River - Reach #2

373. In general the low inflection point was requested on streams where the fishery values were of lesser importance. (Bd. Exh. 37-A.2; Bd. Exh. 37- A.3.)

374. The low inflection point flow requests, when averaged, equal about 20% of the average annual flow. (Bd. Exh. 41, p. 85.)

375. For certain streams a high inflection point was requested, although the low inflection point provides sufficient flows due to the reduced fishery values. On the following streams, the need for a low inflection flow was shown but the need for a high inflection point flow was not shown.

	High Inflection (no need)	Low Inflection (need)
Big Hole Drainage		
California Creek	14	10
French Creek	6	3
Trail Creek	14	6
Trapper Creek	3.2	1.8
Warm Springs Creek	20	5
Wise River	35	20
Jefferson & Boulder Drainage		
Boulder River #2	24	8
Red Rock-Beaverhead Drainage		
Horse Prairie Creek	36	20
Ruby River Drainage		
Wisconsin Creek	12	6

376. The Wetted Perimeter Method is not applicable to braided stream segments because they are difficult to model hydraulically, making most computer models, including WETP, unworkable. Waters having little or no riffle development, such as cascading mountain streams that plunge from pool to pool and some low gradient, prairie streams, are another exception, as are spring Creeks. The seasonably stable flows that characterize spring Creeks prevent the collection of field data at a high, medium and low flow, which is information required to calibrate the wetted perimeter computer program. Other methods must be applied to these waters. (DFWP Exh. 22, Nelson Dir., p. 15; MTU/AFS Exh. 8, Thomas Dir., pp. 4-5.)

377. For 61 stream reaches in its application, DFWP relied upon four alternative approaches for deriving flow requests. (DFWP Exh. 22, Nelson Dir., p. 19.)

378. The first of the four alternate approaches, termed the Fixed Percentage Technique, was applied to 27 highly valued stream reaches, where time constraints, access limitations and other considerations prevented the use of the Wetted Perimeter Method. (DFWP Exh. 22, Nelson Dir., p. 19; Bd. Exh. 37-A.1, p. 1 through 19.) These are:

Beaverhead-Red Rock Sub-basin
Browns Canyon Creek
Red Rock River (Reach #1)
Reservoir Creek
West Fork Dyce Creek

Big Hole Sub-basin
Big Lake Creek
Delano Creek
Jacobson Creek
Rock Creek
Wyman Creek

Gallatin Sub-basin
Hell Roaring Creek

Jefferson Sub-basin
Halfway Creek

Madison Sub-basin
Cougar Creek
Duck Creek
Elk River
Moore Creek
Red Canyon Creek
Trapper Creek
Watkins Creek

Ruby Sub-basin
Coal Creek

Upper Missouri Sub-basin
Deep Creek

Smith Sub-basin
North Fork Deep Creek

Musselshell Sub-basin
Collar Gulch Creek

Marias Sub-basin
Badger Creek
Birch Creek
Cut Bank Creek
North Fork Deep Creek
South Fork Deep Creek

379. For the Fixed Percentage Technique, the high inflection point flows that were derived for those streams in which the Wetted Perimeter Method was applied, were expressed as percentages of the average annual flow for each stream. These percentages were then sorted by sub-basin and the individual percentages in each sub-basin were averaged to derive a sub-basin mean. The mean percentage for each sub-basin was then used to calculate flow requests for the tributary streams in that sub-basin (the above 27) for which flow requests from the Wetted Perimeter Method were not available. High inflection point flows, when averaged by sub-basin, ranged from 27-48% of the average annual flow. (DFWP Exh. 22, Nelson Dir., p. 19.)

380. The second of the four alternative instream flow approaches, termed the Base Flow Approach, was applied to 17 high quality spring-fed streams where seasonally stable flows prevented the required collection of wetted perimeter calibration data at a series of different flows. (DFWP Exh. 22, Nelson Dir., p. 21; MTU/AFS Exh. 8, Thomas Dir., p. 5.)

381. Spring-fed streams have the potential to grow and sustain trout at levels that far exceed the biological capability of most other streams, making them a highly valued fishery and recreational resource. (DFWP Exh. 22, Nelson Dir., p. 21; MTU/AFS Exh. 8, Thomas Dir., p. 5.)

382. The base flow - the lowest mean monthly flow for the year, which typically occurs in winter - is sufficient to protect fishery values on spring-fed streams. Base flow is the typical low flow event on undepleted streams. (DFWP Exh. 22, Nelson Dir., p. 21.)

383. DFWP requested the base flow for the following 17 waters (Bd. Exh. 37-A.1, pp. 1 through 24):

Beaverhead-Red Rock Sub-basin
Poindexter Slough

Gallatin Sub-basin
Ben Hart Spring Creek
Thompson Spring Creek

Jefferson Sub-basin
Willow Spring Creek

Madison Sub-basin
Antelope Creek
Black Sand Spring Creek
Blaine Spring Creek
O'Dell Spring Creek
S.F. of the Madison River

Ruby Sub-basin
Warm Springs Creek

Belt Creek Sub-basin
Big Otter Creek

Lake Helena-Hauser Reservoir
McGuire Creek
Spokane Creek
Silver Creek

Sun Sub-basin
North Fork Willow Creek

Teton Sub-basin
McDonald Creek
Spring Creek

384. Stickney and Wegner Creeks - tributaries to the Missouri River - had flow requests determined by a method similar to the Base Flow Approach. These streams, which are intermittent in their lower reaches, are important in the spring when runoff provides flows which allow rainbow trout to enter from the Missouri River to spawn and for young fish to migrate back to the Missouri River when flows are available. Requested flows were the mean monthly flows for the four months of the year when spawning/rearing occurs. (DFWP Exh. 22, Nelson Dir., pp. 21 and 22; Bd. Exh. 37-A.3, pp. 3-112 to 3-114.)

385. The third of the four alternative instream flow approaches is termed Water Quality and Flow Management Maintenance. For Beaver Creek, Cabin Creek and the West Fork Madison River in the upper Madison River Sub-basin, all remaining unappropriated water was requested instream to help insure that adequate fishery maintenance flows are provided to the upper Madison River when Hebgen Reservoir is filled each year and flow releases into the river are reduced. In addition the application of DFWP sets forth the high inflection points of these streams. (Bd. Exh. 37-A.2, pp. 2-429, 2-433 and 2-442.)

386. For Reach #1 of the East Gallatin River, Bridger Creek, Rocky Creek, and Sourdough Creek - headwaters in the East Gallatin River Sub-basin - all remaining unappropriated water was requested instream to provide the dilution flows that are needed to protect the water quality component of fish habitat in the East Gallatin River, a stream with a history of pollution problems. In addition the application of DFWP sets forth the high inflection points of

these streams. (Bd. Exh. 37-A.2, pp. 2-536 through 2-546 and 2-569 through 2-575.)

387. The fourth alternative method relies on Biological-Flow Relationships developed from long-term field studies. Streams in which flow requests are based, in whole or in part, on biological studies are: Gallatin River - Reach #2; Madison River - Reach #4; Narrows Creek; and Missouri River mainstem Reaches #2 through #6. (Bd. Exh. 37-A.2, pp. 2-31 through 2-32, 2-402 through 2-405, and 2-484 through 2-486; and Bd. Exh. 37-A.3, pp. 3-6 through 3-38.)

388. The instream flow methods used by DFWP to determine the amount of water needed for fishery resources are generally accurate and suitable and on most streams provide reasonable estimates of the amount of water needed to maintain instream benefits.

389. DFWP contracted with the Helena office of the U.S. Geological Survey (USGS) to obtain the physical availability of flows on the streams in its application. (Bd. Exh. 37-A.1, p. 1-29.)

390. The USGS completed Water-Resources Investigations Report 89-4082 entitled "Estimates of Monthly Streamflow Characteristics at Selected Sites in the Upper Missouri River Basin, Montana, Base Period Water Years 1937-86", containing streamflow estimates at 312 sites. Streamflow characteristics that were estimated were the monthly mean discharges that are exceeded 90, 80, 50 and 20 percent of the years of extended record (1937-86) and the mean monthly discharge for each month. (DFWP Exh. 12, p. 1; DFWP Exh. 11, Parrett Dir., p. 2.)

391. Of the 312 sites presented in Report 89-4082, 100 sites had gauged records, 139 had miscellaneous measurement records, and 73 had no streamflow records. (DFWP Exh. 12, p. 3.)

392. Of the 73 sites where no flow measurements were made, flows were estimated using basin characteristics for 52 sites, concurrent measurements for 14 sites and a drainage area ratio adjustment for 7 sites. No sites were estimated using only the channel width method. (DFWP Exh. 12, Table 1, pp. 21-27.)

393. Flow estimating sites for the water availability study were selected by the USGS so that they would be reflective of the flows available to the entire Reach even though the estimated flow at that site may not be the flow at other specific points on the stream. (Parrett Cross, Tr. Day 7, pp. 138 and 143.)

394. The 1937-86 base period of record was selected and the general study approach determined following consultation with the Department of Natural Resources and Conservation and the U.S. Geological Survey. (Parrett Cross, Tr. Day 7, pp. 102, 150 and 151.)

395. Estimates of monthly streamflow characteristics for sites with streamflow gauging stations are considered to be the most reliable. For those gauge sites where the period of actual streamflow record includes the 1937-86 base period, the estimates of monthly streamflow characteristics are based entirely on recorded streamflows and are considered to be perfectly reliable (zero error). (USGS Report 89-4082, DFWP Exh. 12, p. 14.)

396. For estimates of streamflow made at ungauged sites, weighted-average flow estimates based on three methods (basin characteristics, channel width, and concurrent measurement) are generally considered to be the most reliable. If only one estimation method is used, the concurrent measurement method generally provides more reliable estimates than any of the other individual estimating methods. (DFWP Exh. 12, p. 16.)

397. The mean annual flow for the base period 1937-86 is more reflective of the long term mean annual flows of streams in the Missouri River basin than is the 1930-90 period. (Parrett Cross, Tr. Day 7, p. 132; Holland-Grasshopper Exhs. 1 and 2 [graphs]).

398. Water year 1986 was selected as the ending date because it was the latest complete water year available when the study was begun. Water years 1987-89 were not included because these years were not concluded or even yet begun. Water year 1990 began October 1, 1989, three months after DFWP's application was submitted. (DFWP Exh. 46, Spence Reb., pp. 12 and 13.)

399. When considering the impact of a flood event on the mean annual flow of a stream, a flood discharge does not necessarily significantly affect the mean annual flow, the mean monthly flow or the long term mean annual flow. (Parrett Cross, Tr. Day 7, p. 112.)

400. The streamflow measurement techniques used by the USGS in the water availability study are generally accepted as being suitable techniques for estimating streamflows and have been generally accepted by the scientific community. Given the scope of the water availability project, no better techniques could have been used. (Parrett Cross, Tr. Day 7, p. 150.)

401. The 1969 Montana Legislature authorized DFWP to file for instream water rights to protect flows on Blue Ribbon trout streams for fish and wildlife habitat. These rights became known as Murphy Rights after the bill's sponsor. (Bd. Exh. 40, p. 61.)

402. DFWP filed for Murphy Rights on six streams in the Missouri basin. (Bd. Exh. 40, Table 4-13, p. 62; Bd. Exh. 41, Table 4-13, p. 141; DFWP Exh. 46, Spence Reb., Att. A.)

403. All of the Murphy Rights filed in the Missouri River basin have priority dates in December 1970. (DFWP Exh. 46, Spence Reb., Att. A.)

404. A comparison of the water right filings on the six Murphy Right streams and the instream reservations requested on those same streams is shown in Table 1A. Any instream reservations are not additive to the Murphy Rights if granted but are complementary with those Murphy Rights for a given time of year. To the extent they overlap, they would overlap at the same quantities for the periods in which they overlap. (DFWP Stipulation, Tr. Day 8, pp. 139 and 140; Nelson Cross, Tr. Day 4, pp. 31 and 32.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY DFWP IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

405. The direct benefits of reserving the requested instream flows include the preservation of the fisheries resources in the basin, and continuation of fishing opportunities, recreational floating, and continued maintenance of existing riparian communities. (Bd. Exh. 37-A.1, DFWP App., Vol. 1, p. 1-33; DFWP Exh. 37, Knudson Dir., p. 5; DFWP Exh. 31, Duffield Dir., Attach. C, DFWP Exh. 28, Casey, p. 2.)

406. Significant fisheries resources would be protected by DFWP's reservations. DFWP has applied for instream reservations only on those streams with significant fishery resources. (Findings 25 to 273; DFWP Exh. 37, Knudson Dir., p. 3.)

407. Portions of the Madison, Big Hole, Gallatin, Beaverhead and Missouri Rivers are nationally known fishing streams. (DFWP Exh. 37, Knudson Dir., p. 3.)

408. The Ruby, East Gallatin, Jefferson, and Red Rock Rivers are also very important trout streams. (DFWP Exh. 37, Knudson Dir., p. 4.)

409. Tributaries to major rivers serve as vital spawning streams for the larger rivers, as well as habitat for resident fish. (DFWP Exh. 37, Knudson Dir., p. 4.)

410. Fish migrations from reservoirs and lakes throughout the basin provide important stream fishing opportunities. Tributaries to reservoirs and lakes that contain a trout fishery support spawning runs when adequate habitat, water quality and instream flows exist in these streams. (DFWP Exh. 37, Knudson Dir., p. 4.)

411. From Great Falls to Fort Peck Reservoir, the Missouri River and its tributaries support a warmwater fishery of significance. (DFWP Exh. 37, Knudson Dir., p. 5.)

Table 1A

Summary of DFWP "Murphy rights" and reservation requests on Murphy Right streams in the Missouri basin.

STREAM	MURPHY RIGHT REACH	DATES	AMOUNT CFS	RESERVATION REQUEST DATES	AMOUNT CFS
adison River	Hebgan Dam to Quake Lake	4/1-7/31 8/1-3/31	500 500	1/1-12/31	800
adison River	Quake Lake to mouth of West Fork	1/1-12/31	500	1/1-12/31	800
adison River	Mouth of West Fork to Ennis Lake	1/1-5/31 6/1-7/15 7/16-12/31	900 1400 1050	1/1-12/31	1,000
adison River	Ennis Lake to mouth	1/1-5/31 6/1-6/30 7/1-7/15 7/16-12/31	1200 1500 1423 1300	1/1-12/31	1,300
st Gallatin ver	Yellowstone Park to Shedd's Bridge	5/16-7/15 7/16-5/15	800 400	1/1-12/31	170/ 400
llatin River	Mouth to junction with East Gallatin River	5/1-5/15 5/16-5/31 6/1-6/15 6/16-6/30 7/1-8/31 9/1-4/30	947 1278 1500 1176 850 800	1/1-12/31	1,000
ssouri River	Toston Dam to Canyon Ferry Reservoir	1/1-1/31 2/1-5/15 5/16-6/30 7/1-7/15 7/16-9/14 9/15-12/31	2400 2400 4000 3816 2400 2400	1/1-12/31	2,400
ssouri River	Holter Dam to mouth of Smith River	1/1-12/31	3000	5/19-7/5 7/6-5/18	6,398 4,100
ith River	Fort Logan Bridge to confluence of Sheep Creek	5/1-6/30 7/1-4/30	150 90	1/1-12/31	90
ith River	Confluence of Sheep Creek to Cascade-Meagher county line	4/1-4/30 5/1-6/30 7/1-8/31 9/1-3/31	140 150 140 125	1/1-12/31	150
ith River	Cascade-Meagher county line to confluence of Hound Creek	5/1-5/15 5/16-6/15 6/16-6/30 7/1-4/30	372 400 398 150	1/1-12/31	150
g Spring eek	State Fish Hatchery to mouth	1/1-12/31	110	1/1-12/31	110/ 100

1. Exh. 41 (FEIS) p. 141; Spence Reb. DFWP Exh. 46, Attachment A)

412. Paddlefish are Montana's largest gamefish and reside in this Reach of the Missouri River. (Finding 305 to 307.)

413. Pallid and shovelnose sturgeon also reside in this Reach of the Missouri. The pallid sturgeon is listed as an endangered species. (DFWP Exh. 37, Knudson Dir., p. 6.)

414. The middle Missouri is an under-utilized fishery resource, and opportunities for steady growth in the recreational use of the middle Missouri are very good. (DFWP Exh. 37, Knudson Dir., p. 6.)

415. The rivers and streams above Canyon Ferry Dam accounted for 375,239 of the total 1,193,000 days spent fishing in Montana during 1985. (DFWP Exh. 37, Knudson Dir., p. 3.)

416. Several Endangered Species and Species of Special Concern reside in streams in the Missouri River basin. (Findings 274 to 306.)

417. Preserving instream flows will directly benefit recreational floating by helping to maintain existing water depth and velocities on those streams large enough to accommodate canoes, rafts and other types of floating craft. Flows which are sufficient to enable these craft to operate will benefit recreational floaters as well as anglers who float to fish these streams. (DFWP Exh. 37, Knudson Dir., p. 7.)

418. The Missouri River and its tributaries are extensively used and are popular for floating. (DFWP Exh. 37, Knudson Dir., p. 7.)

419. The portion of the Missouri River from Fort Benton to Fort Peck Reservoir was designated as a National Wild and Scenic River in 1976. (DFWP Exh. 37, Knudson Dir., p. 7; Bd. Exh. 40, p. 65.)

420. Reservation for instream flows for Reaches 4, 5, and 6 of the Missouri River would help preserve the biological, recreational, scenic and historical values of this portion of the Missouri. (DFWP Exh. 37, Knudson Dir., p. 7; Bd. Exh. 37-A.1, p. 1-45.)

421. Instream flows enhance the attributes of river bottom lands by keeping riparian plant communities healthy and viable, and by providing habitat for wildlife and birds that people enjoy. (DFWP Exh. 28, Casey Dir., p. 2; DFWP Exh. 37, Knudson Dir., p. 7.)

422. Maintenance of existing riparian vegetation provides the benefit of dampening the effects of flooding through erosion control, and supplying organic material to the aquatic system, enhancing its productivity. (DFWP Exh. 28, Casey Dir., p. 5.)

423. Indirect benefits of reserving the requested instream flow include helping maintain water quality, helping maintain other uses, and supporting the State's recreation and tourist based economies.

424. Instream flow reservations will help maintain water quality by diluting carcinogenic substances, such as arsenic, and other toxic substances in the Missouri basin. (DFWP Exh. 39, Elliot Dir., p. 4.)

425. Streamflow dilution provided by instream flows would help maintain safe drinking water supplies for municipalities and individuals that take drinking water from the Missouri and Madison Rivers. (DFWP Exh. 39, Elliot Dir., p. 4.)

426. Maintaining instream flows through a reservation would help maintain existing water volumes to dilute wastewater discharges from municipalities and industrial sources, as well as return flows from irrigation. (DFWP Exh. 39, Elliot Dir., p. 4.)

427. Instream flow reservations would help maintain the electrical generating capacity of hydropower plants on the Missouri River. (DFWP Exh. 39, Elliot Dir., p. 3.)

428. Stream-based recreation has a significant economic impact in Montana, and tourism-related businesses constitute an expanding industry in Montana. DFWP's instream flow reservation would help protect the outstanding scenic and recreational values that attract tourists to Montana. (DFWP Exh. 37, Knudson Dir., p. 9.)

429. River-based outfitting businesses, as well as service sector businesses, including motels, campgrounds, restaurants and sporting good stores, benefit from maintenance of adequate fisheries and other amenities provided by adequate instream flows. (DFWP Exh. 37, Knudson Dir., p. 9.)

430. Recreational and aesthetic attributes of rivers and streams attract new businesses and economically independent residents to Montana. (DFWP Exh. 37, Knudson Dir., p. 10.)

431. Reserved instream flows will help maintain water levels at existing headgates for agricultural use of water. (DFWP Exh. 37, Knudson Dir., p. 11; DFWP Exh. 10, Graham Dir., p. 7.)

432. Direct costs to DFWP of an instream reservation include monitoring streamflows on certain stream reaches. DFWP may have to install some gauging stations and may have some administrative costs to implement its reservation program, but these costs will be minimal. (DFWP Exh. 37, Knudson Dir., p. 12; Bd. Exh. 37-A.1, p. 1-91.)

433. Indirect costs of reserving the requested instream flow include foregone development by consumptive users and economic opportunity costs to parties other than DFWP.

434. Reservations of instream flows in the Missouri River basin would have no indirect costs to existing industrial water users, but may affect future use of water by industries, primarily mining. (DFWP Exh. 39, Elliot Dir., p. 5; DFWP Exh. 37, Knudson Dir., p. 13.)

435. Water for industrial development could be supplied from other sources, such as groundwater, storage or purchase of existing water rights. (DFWP Exh. 39, Elliot Dir., p. 5; DFWP Exh. 37, Knudson Dir., p. 13.)

436. The possibility of indirect costs to industry is not significant, and has not been quantified. (Bd. Exh. 41, FEIS, p. S-8; DFWP Exh. 39, Elliot Dir., p. 5; DFWP Exh. 37, Knudson Dir., p. 13.)

437. Instream flow reservations would not unnecessarily preclude the use of groundwater or storage for the development of additional irrigation. (Bd. Exh. 41, pp. 55, 108; DFWP Exh. 37, Knudson Dir., p. 13, Bd. Exh. 40, pp 66, 237.)

438. Instream reservations are not inconsistent with the water storage section of the State's water plan. (Bd. Exh. 41, p. 71.)

439. Instream flow reservations will have an effect on the use of existing irrigation water rights if the reservants object to changes in existing rights. These are indirect costs to existing water right holders. All junior water right holders, including reservants, have the right to object to changes in senior water rights. (DFWP Exh. 11, Spence Dir., p. 7.) Such objections do impact existing water rights, by allowing the reservant to object to changes.

440. Reservant's objections, if any, may increase transaction costs for existing water right holders who wish to transfer or otherwise change water rights. (Duffield Cross, Tr. Day 10, p. 171.) An objection may, in some cases, prevent a change from occurring, but only if protected instream flows are measurably degraded as a result of the change. (Finding 471.)

441. DFWP's history of objections to changes in water rights with respect to its "Murphy" rights and Yellowstone basin reservation rights, shows that it objects infrequently to such changes. (DFWP Exh. 11, Spence Dir., p. 7.)

442. Objectors to instream reservations in this proceeding have not quantified any indirect costs to existing water right

holders, which would result from granting the instream reservations. (Duffield Cross, Tr. Day 10, pp. 67-171.)

443. There are indirect costs that result to existing water right holders by granting instream reservations. These costs have not been quantified by the applicant. (Duffield Cross, Tr. Day 10, p. 67, 171.)

444. The costs of applying for the reservations and of conducting the contested case hearing are not direct or indirect costs. (DFWP Exh. 31, Duffield Dir., Att. C; ARM 36.16.102(7).)

445. The direct and indirect costs of granting the instream reservation requests where there are no competing reservations applied for are negligible.

446. Although some potential new water uses with higher values have been identified in these reaches, the overall benefits of granting these requests substantially exceed the nominal direct and indirect costs. (Bd. Exh. 40, p. 255; DFWP Exh. 31, Duffield Dir., p. 18-19.)

447. For DFWP's instream reservations, the benefits and costs to be considered may be summarized as follows:

Direct Benefits	Fish, Wildlife and Recreation Fisheries Maintenance, Fishing Opportunities, Riparian Protection
Indirect Benefits	Hydropower Water Quality
Direct Costs	DFWP Fishery/Recreation Enforcement
Indirect Costs	Foregone Water Consumption for Irrigation or Other Uses Economic opportunity costs to parties other than the reservant

(DFWP Exh. 31, Duffield Dir., Attach. C; Findings 425-470.)

448. A no-action alternative to granting instream flow reservations could result in costs to recreation, fish and wildlife, aesthetic qualities and other economics. In some cases, further consumptive appropriations will result in detrimental affects to aquatic life, wildlife and recreation. (DFWP Exh. 38, p. 75; Bd. Exh. 40, p. 237.)

449. Other alternative actions could be taken to improve or protect instream flows, such as intensification of water conservation measures, leasing of water rights, constructing offstream storage facilities, conditioning water permits, closing basins and applying the public trust doctrine. (DFWP Exh. 38, pp. 75-84.)

450. These alternatives are either more costly, limited in applicability, legally untested or logistically infeasible for basin-wide utilization. (DFWP Exh. 37, Knudson Dir., p. 15.)

451. There are no other reasonable alternatives with greater net benefits. (Bd. Exh. 41, pp. S-8, 34; ARM 36.16.107B(4)(c).)

452. Depending on the location, timing, and amount of water diverted, new water use permits could cause an irretrievable loss of water quality, fisheries, and opportunities for recreation. (Bd. Exh. 40, p. 244; ARM 36.16.107B(4)(d).)

453. Incremental streamflow depletions will continue to reduce critical components of the natural environment, including fishery resources, wildlife riparian areas and water quality. (DFWP Exh. 38, p. 73.)

454. Reservations for instream flow are the only way to protect streamflow for water quality, fisheries and recreation on nearly all streams where such reservations are requested. (Bd. Exh. 40, p. 244.)

455. DFWP's instream flow reservation would not have adverse impacts to public health, safety and welfare. (Bd. Exh. 40, pp. 243-244; DFWP Exh. 38, p. 42; ARM 36.16.107B(4)(e).)

456. In general, the impacts to public health, safety and welfare from instream flow reservations are positive and beneficial. (Bd. Exh. 40, pp. 243-244; DFWP Exh. 38, pp. 41-42.)

457. The instream flows requested by DFWP as modified by Findings of Fact 325 through 404 by the Board are necessary to maintain the existing resident fish populations, to provide passage for migratory fish species in certain streams, to protect spawning and rearing habitats of both resident and migratory species, to protect the habitats of game fish "Species of Special Concern" such as the westslope cutthroat trout, arctic grayling, pallid sturgeon and paddlefish, as well as nongame species such as sturgeon chub, sickelfin chub and the northern redbelly dace x finescale dace hybrid. The flows are also necessary to help protect the habitat for those wildlife species which depend on the streams and their riparian zones for food, water and shelter, including the bald eagle, peregrine falcon, whooping crane and grizzly bear, all of which are threatened or endangered species. (Bd. Exh. 37-A.2 and 37-A.3, inclusive; ARM 36.16.107B(4)(f).)

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

458. The water reservation by DFWP will be used wholly within the state and only within the Missouri River basin. (Bd. Exh. 37-A.1; ARM 36.16.107B(5) and (6).)

459. DFWP has a management plan for measuring, protecting, and reporting on instream reservations. (Bd. Exh. 37-A.1, pp. 1-90 through 1-95 and 1-106 (Appendix B); DFWP Exh. 10, Graham Dir., pp. 5 and 6; DFWP Exh. 17, Spence Dir., pp. 7 through 10.)

460. The management plan is based upon the process DFWP has followed for its Yellowstone reservations. (Bd. Exh. 37-A.1, pp. 1-91 through 1-93; DFWP Exh. 10, Graham Dir., p. 5.)

461. DFWP intends to notify new junior water use permit holders when an instream water reservation exists in the source of supply, or the exercise of the junior right could affect the reservation either through a letter or by the permit process. DFWP would object and request denial of permits only when the use of the water would routinely adversely effect an instream reservation. Otherwise, in its objections to new permits, DFWP will request that the permit be specifically conditioned to the senior instream flow reservation. (Bd. Exh. 37-A.1, p. 1-92; DFWP Exh. 10, Graham Dir., p. 5.)

462. When low flow or drought years threaten instream reservations, DFWP intends to initially advise junior users by letter of potential low flow conditions and, when flows deteriorate below instream reservations, junior water users will be requested by mail to cease their diversions until flows again rise above the reservation amount. (Bd. Exh. 37-A.1, pp. 1-92 and 1-93; DFWP Exh. 10, Graham Dir., pp. 5 and 6; DFWP Exh. 19, Chronology of Enforcement Actions; Tr.-Day 8, Spence, p. 76.)

463. Implementation of an instream flow reservation management plan for monitoring and protection of instream reservations would be an evolutionary process. The timing and degree of the monitoring of individual streams will depend on the extent of junior water use in and above any particular stream reach. (Bd. Exh. 37-A.1, pp. 1-90 and 1-91; DFWP Exh. 10, Graham Dir., p. 5.)

464. As circumstances require, DFWP may need to request DNRC to exercise its authority to enforce compliance by junior permit holders, or may need to use water commissioners, if legally available for reservations, to distribute water according to priority dates, or may need to use any other enforcement remedies available to a water right holder. (Bd. Exh. 37-A.1, p. 1-93; DFWP Exh. 10, Graham Dir., p. 6.)

465. Enforcement of instream reservations can restrict only junior consumptive users or those diverting water without a right, such as the expansion of a senior right beyond the quantity of water the senior is entitled to use. (Bd. Exh. 37-A.1, pp. 1-90; DFWP Exh. 10, Graham Dir., pp. 6 and 7.)

466. Instream reservations should be monitored and measured using a "reach concept." DFWP has applied for instream reservations on designated stream or river segments or reaches. Each instream flow reservation request was derived at a point on the reach, generally near the downstream end of the reach. The instream reservation will be measured and monitored at these points on the reach or downstream from these points. (Bd. Exh. 37-A.1, pp. 1-90 and 1-91; DFWP Exh. 17, Spence Dir., pp. 9 and 10.)

467. The stream or river reaches are the lengths of streams or rivers where fisheries, wildlife and recreational values warrant protection (see application descriptions in Bd. Exh. 37-A.2 and Bd. Exh. 37-A.3; and, resource value descriptions for each stream in the prefiled direct testimony of DFWP witnesses).

468. When instream flows fall below the reservation flows at the monitoring points, all junior users above these monitoring sites will be subject to restrictions whether they are on the reach mainstem or its tributaries. (Bd. Exh. 37-A.1, pp. 1-90 and 1-91; DFWP Exh. 17, Spence Dir., pp. 9 and 10.)

469. The stream reach does not represent a stream segment that has the same flow regime and instream flow requirement throughout its length. The values of the stream reach will be protected by monitoring the flows at or below the point where the minimum flow needs were determined. (Bd. Exh. 37-A.1, p. 1-90; DFWP Exh. 17, Spence Dir., pp. 9 and 10.)

470. The monitoring of instream flows at a downstream point in the reach is a practical approach to protecting fisheries, wildlife and recreational values within the reach. (Nelson Redirect, Tr. Day 9, pp. 107, 108.)

471. The effect of monitoring at a point in each reach will be that the instream reservation could be adversely affected and DFWP could, therefore, object to any new proposed junior users or to changes in use above the monitoring point when the new uses or change would result in the consumption of additional water affecting the flows at the monitoring point or adversely affect flows in the reach. (Bd. Exh. 37-A.1, pp. 1-90 through 1-92; DFWP Exh. 17, Spence Dir., pp. 9 and 10.)

472. A change occurring within a reach or a change that affects a reach could adversely affect instream flows within the reach.

473. Further information concerning streamflows above the monitoring point will be needed before the instream flow reservation can be adequately monitored and enforced.

474. DFWP is capable of exercising reasonable diligence towards measuring, quantifying, protecting, and reporting its instream water reservation in accordance with the management plan. (ARM 36.16.107B(7).)

475. The instream reservations applied for by DFWP would not remove or consume any water in a source of supply for an existing water right use. (DFWP 72155-41a, Bd. Exhs. 37-A.1, 37-A.2 and 37-A.3.)

476. The instream reservation requests of DFWP are intended to preserve the present status quo against future additional consumptive uses of water that would erode or further erode the minimum instream flows needed for healthy fisheries. (DFWP 72155-41a, Bd. Exh. 37-A.1, p. 1-90; DFWP Exh. 10, Graham Dir., p. 5 ; DFWP Exh. 17, Spence Dir., p. 10; DFWP Exh. 46, Spence Reb., pp. 2 & 16.)

477. In those streams and stream reaches where DFWP's instream flow reservations overlap with DHES' and BLM's instream requests, all such reservations should be concurrent, rather than cumulative. (Bd. Exh. 40, p. 11; Bd. Exh. 41, p. 68.)

478. In those streams and stream reaches where DFWP already has instream flow rights, the amount of water reserved should be concurrent with such prior right, rather than cumulative. (Finding 404.)

479. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this order and the public interest in protecting municipal reservations with a July 1, 1985 priority date outweigh the values protected by the DFWP reservation.

480. The water reservation as conditioned would not adversely affect any water right with a priority date before July 1, 1985. (Mont. Code Ann. § 85-2-316(9)(e); ARM 36.16.107B(8).)

III. CONCLUSIONS OF LAW

1. DFWP is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).

2. The purpose of the DFWP application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the DFWP application has been established. (Mont. Code Ann. § 85-2-316(4)(ii)(1991); ARM 36.16.107B(2).) Specifically, DFWP has demonstrated that there is a reasonable likelihood that future in-state competing water uses would consume, degrade and otherwise affect the water available for the purpose of DHES' reservation and DHES has demonstrated the water resource values warrant reserving water for the requested purpose.

4. The methodologies used by DFWP are generally accurate and suitable. (ARM 36.16.107B(3)(a).) DFWP has established the amount of water needed to fulfill its reservation as set forth in Table 2. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(4).)

5. The benefits of granting these instream flows requested as modified and conditioned herein exceed the direct and indirect costs. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by DFWP as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. s 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

9. This reservation does not guarantee minimum flows.

IV. ORDER

1. Subject to all applicable conditions, and limitations (including but not limited to the conditions applied to instream reservations in Exhibits A and C attached to this Order) the application of DFWP is granted as set forth in Table 2.

2. DFWP shall within two years of the date of the Final Order submit to the Board a list of monitoring sites and a method of determining the extent of the instream flow along the reach proportional to the monitoring sites. Until approval of this monitoring report the DFWP may not object to any changes of use by other users within a reach.

3. Relative to other reservations the priority date of the DFWP shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences. It shall be prior to the United States Department of Interior (Bureau of Land Management), other reservations granted to Conservation Districts and the reservation granted to the United States Bureau of Reclamation.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The DFWP instream flow reservation shall run concurrently with any other non-consumptive water rights including but not limited to all hydropower rights and other instream flow reservations.

6. The DFWP reservation shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and for any class of uses for which permit applications are precluded.

DFWP Instream flow amounts allowed

HEADWATERS SUBBASIN

BIG HOLE RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs
American Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8
Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2.8
Big Hole River #1	Warm Springs Creek to Pintlar Creek	Jan 1 - Dec 31	160
Big Hole River #2	Pintlar Creek to the old Divide Dam	Jan 1 - Dec 31	800
Big Hole River #3	Old Divide Dam to mouth	Jan 1 - Dec 31	573
Big Lake Creek	Twin Lakes outlet to mouth	Jan 1 - Dec 31	4.7
Birch Creek	Mule Creek to mouth	Jan 1 - Dec 31	10
Bryant Creek	Headwaters to mouth	Jan 1 - Dec 31	1.4
California Creek	Headwaters to mouth	Jan 1 - Dec 31	10
Camp Creek	Headwaters to mouth	Jan 1 - Dec 31	5
Canyon Creek	Canyon Lake to mouth	Jan 1 - Dec 31	5
Corral Creek	Headwaters to mouth	Jan 1 - Dec 31	1
Deep Creek	Sevenmile and Tenmile to mouth	Jan 1 - Dec 31	18
Delano Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3
Divide Creek	North and East forks to mouth	Jan 1 - Dec 31	3
Fishtrap Creek	West and Middle forks to mouth	Jan 1 - Dec 31	10
Francis Creek	Sand Creek to mouth	Jan 1 - Dec 31	4
French Creek	Headwaters to mouth	Jan 1 - Dec 31	3
Governor Creek	Headwaters to mouth	Jan 1 - Dec 31	4
Jacobsen Creek	Tahepia Lake to mouth	Jan 1 - Dec 31	14
Jerry Creek	Headwaters to mouth	Jan 1 - Dec 31	7
Johnson Creek	Schultz Creek to Forest Service boundary	Jan 1 - Dec 31	13
Joseph Creek	Anderson Creek to mouth	Jan 1 - Dec 31	5
LaMarche Creek	West and Middle forks to mouth	Jan 1 - Dec 31	11
Miner Creek	Upper Miner Lakes to mouth	Jan 1 - Dec 31	9
Moose Creek	Headwaters to mouth	Jan 1 - Dec 31	9
Mussigbrod Creek	Hell Roaring Creek to uppermost existing diversion point in NWSENW Section 9 T1S R16W	Jan 1 - Dec 31	10
NF Big Hole River	Ruby and Trail creeks to mouth	Jan 1 - Dec 31	30
Oregon Creek	Headwaters to mouth	Jan 1 - Dec 31	0.3
Pattengail Creek	Sand Lake to mouth	Jan 1 - Dec 31	12
Pintlar Creek	Oreamnos Lake to mouth	Jan 1 - Dec 31	10
Rock Creek	Beaverhead National Forest boundary to mouth	Jan 1 - Dec 31	5
Ruby Creek	Pioneer and WF Ruby creeks to mouth	Jan 1 - Dec 31	4
Sevenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.8
Seymour Creek	Upper Seymour Lake to mouth	Jan 1 - Dec 31	13
Sixmile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.6
SF Big Hole River	Skinner Lake to mouth	Jan 1 - Dec 31	22
Steel Creek	Headwaters to mouth	Jan 1 - Dec 31	6
Sullivan Creek	Headwaters to mouth	Jan 1 - Dec 31	4
Swamp Creek	Yank Swamp to mouth	Jan 1 - Dec 31	8
Tenmile Creek	Tenmile Lakes to mouth	Jan 1 - Dec 31	3.8
Trail Creek	Headwaters to mouth	Jan 1 - Dec 31	6
Trapper Creek	Trapper Lake to mouth	Jan 1 - Dec 31	1.8
Twelvemile Creek	Headwaters to mouth	Jan 1 - Dec 31	1.2
Warm Springs Creek	West and East forks to mouth	Jan 1 - Dec 31	5
Willow Creek	Tendoy Lake to mouth	Jan 1 - Dec 31	16
Wise River	Mono and Jacobson creeks to mouth	Jan 1 - Dec 31	20
Wyman Creek	Headwaters to mouth	Jan 1 - Dec 31	7

GALLATIN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Baker Creek	Heeb Lane Bridge to mouth	Jan 1 - Dec 31	14
Ben Hart Creek	Headwaters to mouth	Jan 1 - Dec 31	29
Big Bear Creek	Headwaters to mouth	Jan 1 - Dec 31	2
Bridger Creek	Headwaters to mouth	Jan 1 - Dec 31	14
Cache Creek	Headwaters to mouth	Jan 1 - Dec 31	2.6
EF Hyalite Creek	Heather Lake to Hyalite Reservoir	Jan 1 - Dec 31	7
East Gallatin River #1	Rocky and Sourdough cks to Bozeman STP outlet	Jan 1 - Dec 31	42.4
East Gallatin River #2	Bozeman STP outlet to Thompson Spring Creek	Jan 1 - Dec 31	90
East Gallatin River #3	Thompson Spring Creek to mouth	Jan 1 - Dec 31	170
Gallatin River #1	Yellowstone NP boundary to WF Gallatin River	Jan 1 - Dec 31	170
Gallatin River #2	WF Gallatin River to East Gallatin River	Jan 1 - Dec 31	400
Gallatin River #3	East Gallatin River to mouth	Jan 1 - Dec 31	533.5
Hell Roaring Creek	NF Hell Roaring Creek to mouth	Jan 1 - Dec 31	16
Hyalite (Middle) Creek #1	Middle Creek Dam to Middle Creek Ditch intake	Jan 1 - Dec 31	28
Hyalite (Middle) Creek #2	I-90 bridge near Belgrade to mouth	Jan 1 - Dec 31	16
MF of the WF Gallatin R.	Headwaters to NF of the WF Gallatin River	Jan 1 - Dec 31	3
Porcupine Creek	NF Porcupine Creek to mouth	Jan 1 - Dec 31	4.5
Reese Creek	Bill Smith Creek to mouth	Jan 1 - Dec 31	5
Rocky Creek	Jackson Creek to Sourdough Creek	Jan 1 - Dec 31	18
Sourdough (Bozeman) Ck.	Mystic Reservoir to mouth	Jan 1 - Dec 31	11
South Cottonwood Creek	Jim Creek to Hart Ditch headgate	Jan 1 - Dec 31	14
SF Spanish Creek	Falls Creek to mouth	Jan 1 - Dec 31	15
SF of the WF Gallatin R.	Headwaters to mouth	Jan 1 - Dec 31	5
Spanish Creek	North and South forks to mouth	Jan 1 - Dec 31	70
Squaw Creek	Headwaters to mouth	Jan 1 - Dec 31	12
Taylor Fork	Tumbledown Creek to mouth	Jan 1 - Dec 31	36
Thompson Spring Creek	County road crossing in T1N R5E Sec 30 to mouth	Jan 1 - Dec 31	29
WF Gallatin River	Middle and North forks to mouth	Jan 1 - Dec 31	26
WF Hyalite Creek	Hyalite Lake to Hyalite Reservoir	Jan 1 - Dec 31	12

JEFFERSON AND BOULDER RIVER DRAINAGES

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Boulder River #1	West and South forks to High Ore Creek	Jan 1 - Dec 31	20
Boulder River #2	High Ore Creek to Cold Spring	Jan 1 - Dec 31	8
Boulder River #3	Cold Spring to mouth	Jan 1 - Dec 31	47
Halfway Creek	Headwaters to canyon	Jan 1 - Dec 31	1.9
Hells Canyon Creek	Headwaters to mouth	Jan 1 - Dec 31	3.6
Jefferson River	Headwaters to Madison River	Jan 1 - Dec 31	1,095.5
Little Boulder River	Moose Creek to mouth	Jan 1 - Dec 31	7
North Willow Creek	Hollow Top Lake to mouth	Jan 1 - Dec 31	7
South Boulder River	Curly Creek to mouth	Jan 1 - Dec 31	12
South Willow Creek	Granite Lake to mouth	Jan 1 - Dec 31	14
Whitetail Creek	Whitetail Reservoir to mouth	Jan 1 - Dec 31	3
Willow Creek	North and South Willow creeks to mouth	Jan 1 - Dec 31	14
Willow Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	9.2

UPPER MISSOURI RIVER AND TRIBUTARIES (continued)

Missouri River #3	Holter Dam to Great Falls	Jan 1 - Dec 31	3,327
Prickly Pear Creek #1	Rabbit Gulch to Hwy 12 bridge in East Helena	Jan 1 - Dec 31	22
Prickly Pear Creek #2	Hwy 12 bridge in East Helena to Lake Helena	Jan 1 - Dec 31	30
Sevenmile Creek	Greenhorn Creek and Skelly Gulch to mouth	Jan 1 - Dec 31	1.0
Sheep Creek	Headwaters to mouth	Jan 1 - Dec 31	35
Sheep Creek	Headwaters of South Fork to mouth	Jan 1 - Dec 31	22
Silver Creek	Helena Valley Irrigation Canal to mouth	May 1 - Nov 30	13.0
		Dec 1 - Apr 30	5.4
Sixteenmile Creek	Billy Creek to mouth	Jan 1 - Dec 31	20
Spokane Creek	Helena Valley Irr. Canal to mouth	May 1 - Nov 30	4.0
		Dec 1 - Apr 30	3.0
Stickney Creek	North and South forks to mouth	Apr 1 - Apr 30	7
		May 1 - May 31	34
		June 1 - June 30	35
		July 1 - July 31	7
Tenmile Creek	Headwaters to mouth	Jan 1 - Dec 31	12.0
Trout Creek	Springs near Vigilante Campground to mouth	Jan 1 - Dec 31	15.0
Virginia Creek	Headwaters to mouth	Jan 1 - Dec 31	6.0
Wegner Creek	Headwaters to mouth	Apr 1 - Apr 30	8
		May 1 - May 31	41
		June 1 - June 30	38
		July 1 - July 31	8
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.5
Wolf Creek	Headwaters to mouth	Jan 1 - Dec 31	7.0

DEARBORN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	110
Flat Creek	Headwaters to mouth	Jan 1 - Dec 31	7.5
MF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	9.5
SF Dearborn River	Headwaters to mouth	Jan 1 - Dec 31	11.5

SMITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Big Birch Creek	Headwaters to mouth	Jan 1 - Dec 31	11
Eagle Creek	Headwaters to mouth	Jan 1 - Dec 31	2.5
Hound Creek	EF Hound Creek and Middle Creek to mouth	Jan 1 - Dec 31	35
Newlan Creek	Headwaters to mouth	Jan 1 - Dec 31	3.8
NF Deep Creek	Headwaters to rock cascades	Jan 1 - Dec 31	1.0
NF Smith River	Headwaters to mouth	Jan 1 - Dec 31	9
Rock Creek	Headwaters to mouth	Jan 1 - Dec 31	11
Smith River #1	North and South Forks Sheep Creek	Jan 1 - Dec 31	78.5
Smith River #2	Sheep Creek to Hound Creek	Jan 1 - Dec 31	150
Smith River #3	Hound Creek to mouth	Jan 1 - Dec 31	80
SF Smith River	Headwaters to mouth	Jan 1 - Dec 31	7
Tenderfoot Creek	Headwaters to mouth	Jan 1 - Dec 31	15

SUN RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Elk Creek	Headwaters to mouth	Jan 1 - Dec 31	16
Ford Creek	Headwaters to mouth	Jan 1 - Dec 31	12
NF Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3.0
Sun River #1	Diversion Dam to Elk Creek	Jan 1 - Dec 31	100
Sun River #2	Elk Creek to mouth	Jan 1 - Dec 31	130
Willow Creek	Headwaters to mouth	Jan 1 - Dec 31	3

BELT CREEK DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Belt Creek #1	Headwaters to Big Otter Creek	Jan 1 - Dec 31	90
Belt Creek #2	Big Otter Creek to Missouri River	Jan 1 - Dec 31	35
Big Otter Creek	Whiskey Spring Coulee to Belt Creek	Jan 1 - Dec 31	5
Dry Fork Belt Creek	Galena and Oti Park Creek to Belt Creek	Jan 1 - Dec 31	7
Logging Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	6
Pilgrim Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	8
Tillinghast Creek	Headwaters to Belt Creek	Jan 1 - Dec 31	5.5

MIDDLE MISSOURI SUBBASIN

MIDDLE MISSOURI RIVER AND TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Cow Creek	NF and SF to County bridge	Jan 1 - Dec 31	4.5
Highwood Creek	Headwaters to Hwy 228 Bridge at Highwood	Jan 1 - Dec 31	10
Missouri River #4	Great Falls to Maris River	Jan 1 - Dec 31	3,876
Missouri River #5	Marias River to Judith River	Jan 1 - Dec 31	4,280
Missouri River #6	Judith River to upper end of Fort Peck Reservoir	Jan 1 - Dec 31	4,652
Shonkin Creek	Forest boundary to town of Shonkin	Jan 1 - Dec 31	7

FORT PECK RESERVOIR TRIBUTARIES

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Big Dry Creek	Hwy 200 bridge to mouth	Mar 15 - Mar 31	300
		Apr 1 - Apr 30	100
		May 1 - May 31	35
		June 1 - Oct 31	5.5
Little Dry Creek	Whiteside ranch house to Big Dry Creek	Mar 15 - Mar 31	110
		Apr 1 - Apr 30	42
		May 1 - May 31	17
		June 1 - Oct 31	3.5

JUDITH RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Beaver Creek	West Fork to Cottonwood Creek	Jan 1 - Dec 31	5
Big Spring Creek #1	Fish hatchery to Cottonwood Creek	Jan 1 - Dec 31	53.5
Big Spring Creek #2	Cottonwood Creek to mouth	Jan 1 - Dec 31	100
Cottonwood Creek	Spring Branch of Cottonwood Ck. to Big Spring Ck.	Jan 1 - Dec 31	4.5
East Fork Big Spring Ck.	Headwaters to Big Spring Creek	Jan 1 - Dec 31	7.5
Judith River #1	SF and MF to Big Spring Creek	Jan 1 - Dec 31	25
Judith River #2	Big Spring Creek to Missouri River	Jan 1 - Dec 31	160
Lost Fork Judith River	SF and WF to MF Judith River	Jan 1 - Dec 31	14
Middle Fork Judith River	Headwaters to South Fork	Jan 1 - Dec 31	22
South Fork Judith River	Headwaters to Middle Fork	Jan 1 - Dec 31	3.5
Warm Spring Creek	Springs to Judith River	Jan 1 - Dec 31	110
Yogo Creek	Headwaters to MF Judith River	Jan 1 - Dec 31	3

MUSSELSHELL RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Alabaugh Creek	Headwaters to mouth	Jan 1 - Dec 31	12
American Fork Creek	South Fork to mouth	Jan 1 - Dec 31	5.5
Big Elk Creek	Origin at Lebo Fork to mouth	Jan 1 - Dec 31	9.5
Careless Creek	Headwaters to Roberts Creek	Jan 1 - Dec 31	2
Checkerboard Creek	East and West Forks to mouth	Jan 1 - Dec 31	6
Collar Gulch Creek	Headwaters to mouth	Jan 1 - Dec 31	0.6
Cottonwood Creek	WF, MF, and Loco Creek to mouth	Jan 1 - Dec 31	16
Flatwillow Creek	NF and SF to Petrolia Reservoir	Jan 1 - Dec 31	15
Musselshell River #1	NF and SF to Deadmans Basin Div	Jan 1 - Dec 31	80
Musselshell River #2	Deadmans Basin Div to Musselshell Div	Jan 1 - Dec 31	80
Musselshell River #3	Musselshell Diversion Dam at town of Musselshell to mouth	Jan 1 - Dec 31	70
NF Musselshell #1	Headwaters to Bair Reservoir	Jan 1 - Dec 31	3
NF Musselshell #2	Bair Reservoir to SF Musselshell R.	Jan 1 - Dec 31	16
SF Musselshell	Headwaters to North Fork	Jan 1 - Dec 31	30
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	8
Swimming Woman Ck.	Headwaters to Cty road crossing 8 linear miles upstream from mouth	Jan 1 - Dec 31	2.5

MARIAS/TETON SUBBASIN

MARIAS RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Badger Creek	N and S Badger creeks to Forest/ Blackfeet Reservation Boundary	Jan 1 - Dec 31	60
Birch Creek	Swift Reservoir to Hwy 358	Jan 1 - Dec 31	64
Cut Bank Creek	Blackfeet Reservation boundary to mouth	Jan 1 - Dec 31	75
Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12
Marias River #1	Two Medicine River and Cut Bank Creek to head of Tiber Reservoir	Jan 1 - Dec 31	200
Marias River #2	Tiber Dam to Circle Bridge (Hwy 223)	Jan 1 - Dec 31	419.5
Marias River #3	Circle Bridge (Hwy 223) to mouth	Jan 1 - Dec 31	488.5
North Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	14
NF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	12
South Badger Creek	Headwaters to mouth	Jan 1 - Dec 31	40
SF Dupuyer Creek	Headwaters to mouth	Jan 1 - Dec 31	6
SF Two Medicine River	Headwaters to Forest/Blackfeet Reservation Boundary	Jan 1 - Dec 31	16

TETON RIVER DRAINAGE

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (cfs)
Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	18
McDonald Creek	Headwaters to mouth	Jan 1 - Dec 31	10
NF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	7.2
SF Deep Creek	Headwaters to mouth	Jan 1 - Dec 31	6.9
Spring Creek	Headwaters to mouth	Jan 1 - Dec 31	4.5
Teton River	Headwaters to discharge from Priest Butte Lake	Jan 1 - Dec 31	35

LAKES AND SWAMPS

STREAM	REACH DESCRIPTION	DATES GRANTED	AMOUNT ALLOWED (af/yr)
Bean Lake	Sec. 18C and 19B, T18N, R6W, Sec. 13D and 24A, T18N, R7W	Jan 1 - Dec 31	2,649
Antelope Butte Swamp	North 1/2 Sec. 28, T26N, R8W	Jan 1 - Dec 31	460

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF BUREAU OF LAND MANAGEMENT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The United States Department of the Interior, Bureau of Land Management (BLM) is a United States government agency and is therefore qualified to reserve water pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 38-A, p.1.)

2. The Federal Land Policy and Management Act of 1976 (Public Law 94-579) provides that "the public lands be managed in a manner...that will provide food and habitat for fish and wildlife...and that will provide outdoor recreation..." Executive Order 11990 directs the BLM to "[t]ake action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural beneficial values of wetlands." Therefore, the United States Department of the Interior, Bureau of Land Management has the authority to apply for instream flow reservations for fish, wildlife, and their habitat on BLM lands within the State of Montana in the Upper Missouri River pursuant to Mont. Code Ann. § 85-2-316(1.)

3. BLM submitted an application to the Board of Natural Resources and Conservation in June 1989 to reserve water to maintain a minimum flow, level, or quality of water throughout the year or portions of the year on 31 sources of water located in the headwaters subbasin of the Missouri River. The waters applied for, including reach boundaries and amounts of water requested, are shown in Table 1. (Bd. Exh. 38-A, pg. 1.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY BUREAU OF LAND MANAGEMENT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

4. The purpose of the reservation of instream flows is to benefit the public by reserving instream flows for fish, wildlife, and recreational purposes. (Bd. Exh. 38-A, p.1.) This is a beneficial use as defined by ARM 36.16.102(B).

5. The preserving of instream flows will benefit other wildlife, aquatic, and terrestrial that are dependent upon riparian vegetation sustained by instream flows. (Bd. Exh. 38-A, p. 1.)

6. Recreational activities such as hunting, fishing, hiking, and camping will also benefit from the reservations. (Bd. Exh. 38-A, p. 1.)

TABLE 1
SUMMARY OF RESERVATIONS REQUESTED BY THE BUREAU OF LAND MANAGEMENT

STREAM	LOCATION	STREAM MILES WITHIN PUBLIC LANDS	YEAR-ROUND REQUEST (CFS)	INSTANTANEOUS PEAK DISCHARGE REQUEST (CFS)
Deep Creek	T2N-R12W-S20	.9	30	500
Bear Creek	T2N-R12W-S34	1.1	2.5	50
Canyon Creek	T2S-R9W-S6	.9	5.0	110
Moose Creek	T2S-R9W-S13&23 T1S-R8W-S7,8,9&18	5.5	8	70
Camp Creek	T2S-R8W-S2,9, 10,11,17,19&20	6.5	5	50
Willow Creek	T4S-R9W-S31&32	1.9	12	130
East Fork Dyce Creek	T6S-R12W-S14, 23,26&35	3.75	1.5	9
West Fork Dyce Creek	T6S-R12W-S14, 22,23&26	3.8	1	5
Bloody Dick Ck.	T9S-R15W-S23	1	20	270
Medicine Lodge Creek	T12S-R12W-S13 T13S-R12W-S2&26	1	9	50
Rape Creek	T10S-R13W-S21&28	1	1	5
Shenon Creek	T10S-R13W-S29,30, 32&33; T10S-R14W-S25	3.5	1	13
Black Canyon Creek	T11S-R14W-S19,20, 21	2.8	2.5	35
Bear Creek (Horse Prarie Creek Drainage)	T10S-R15W-S34	1.3	1	50
Trapper Creek	T10S-R15W-S34	1.3	1	10
Frying Pan Ck.	T10S-R25W-S22,27&28	1	1.5	35

TABLE 1 (cont.)

STREAM	LOCATION	STREAM MILES WITHIN PUBLIC LANDS	YEAR-ROUND REQUEST (CFS)	INSTANTANEOUS PEAK DISCHARGE REQUEST (CFS)
Cabin Creek	T14S-R12W-S1&12	1.3	1	4
Indian Creek	T14S-R12W-S24	1.3	1	5
Simpson Creek	T14S-R12W-S25&30	0.8	1	5
Deadman Creek	T15S-R10W-S22	2.0	4.5	50
Big Sheep Ck.	T13S-R9W-S30 T13S-R10W-S25,35&36 T14S-R10W-S2,10,15,22&34 T15S-R10W-S3,10&22	10.0	40	300
North Fork Greenhorn Creek	T8-R4W-S13&24	1.3	3.5	35
Jones Creek	T14S-R3W-S33	1.1	2.0	20
Peet Creek	T15S-R4W-S3&10 T14S-R4W-S34	2.25	1.5	30
Corral Creek	T14S-R1E-S22&27	1.5	2.5	20
Odell Creek	T14S-R1W-S31	0.8	11	225
Long Creek	T13S-R4W-S1&2	3.9	5	110
Hellroaring Ck.	T14S-R1E-S35&26	0.75	15	250
Tom Creek	T14S-R1E-S32	1.2	2	25
East Fork Blacktail Deer Creek	T11S-R5W-S27,34&35	3.4	18	215
West Fork Blacktail Deer Creek	T12S-R6W-S35	2.5	3	25

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE BUREAU OF LAND MANAGEMENT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

7. The BLM has established a need for the reservation pursuant to ARM 36.16.107B(2) based on the following:

a. Instream water right for fish, wildlife, and recreational purposes can be obtained only by application for a reservation and not through a water permit. (Bd. Exh. 38-A, p. 22);

b. past experience has shown that stream flows will continue to be depleted; increasing the annual occurrence of critically low flows if minimum flows aren't protected. (Bd. Exh. 38-A, p. 1, Appendix A.)

8. The following streams are particularly subject to future appropriations that would adversely affect resource values.

Stream	Type of Potential Appropriation
Frying Pan Creek	Mining
Trapper Creek	Mining
Willow Creek	Mining/Hydroelectric
Moose Creek	Mining/Hydroelectric
Bear Creek (Big Hole Drainage)	Irrigation
Deep Creek	Irrigation
Medicine Lodge Creek	Irrigation
Bloody Dick Creek	Irrigation/Mining
W. Fork Dyce Creek	Mining
E. Fork Dyce Creek	Mining
Canyon Creek	Mining/Hydroelectric
Camp Creek	Mining/Hydroelectric
Big Sheep Creek	Irrigation/Hydroelectric
Deadman Creek	Irrigation
Rape Creek	Mining

(Bd. Exh. 38-A, p. 8.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE BUREAU OF LAND MANAGEMENT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

9. The following chart shows the fishery and recreational values of each stream.

Stream Name	Beneficial Use
Deep Creek	Survival and rearing of brook and rainbow trout. Spawning of Arctic grayling and brook trout. Recreation, sport fishery.
Bear Creek	Survival and rearing of brook and rainbow trout. Recreation, sport fishery.
Canyon Creek	Survival and rearing of rainbow, rainbow x cutthroat, brook trout, impt. spawning area. Recreation, sport fishery.
Moose Creek	Survival and rearing of rainbow trout, rainbow x cutthroat, impt. spawning area. Recreation, sport fishery.
Camp Creek	Survival and rearing of brook trout, rainbow trout, cutthroat trout, impt. spawning area. Recreation, sport fishery.
Willow Creek	Survival and rearing of rainbow trout, rainbow x cutthroat trout, brook trout. Recreation, sport fishery.
East Fork Dyce Creek	Survival and rearing of rainbow x cutthroat trout, brook trout.
West Fork Dyce Creek	Survival and rearing of rainbow x cutthroat trout, brook trout.
Bloody Dick Creek	Survival and rearing of rainbow trout, brook trout, mountain whitefish. Recreation, sport fishery.
Medicine Lodge Creek	Survival and rearing of brook trout, rainbow trout. Recreation, sport fishery.

Rape Creek	Spawning and survival of westslope cutthroat trout.
Shenon Creek	Spawning and survival of brook trout, westslope cutthroat trout, rainbow x cutthroat trout. Recreation, sport fishery.
Black Canyon	Survival and rearing of brook trout.
Bear Creek (Horse Prairie Drainage)	Spawning, rearing, and survival of brook trout, westslope cutthroat trout.
Trapper Creek	Spawning, rearing survival of westslope cutthroat trout, brook trout.
Frying Pan Creek	Spawning, rearing survival of westslope cutthroat trout.
Cabin Creek	Spawning, rearing survival of westslope cutthroat trout.
Indian Creek	Spawning, rearing survival of westslope cutthroat trout.
Simpson Creek	Spawning, rearing survival of westslope cutthroat trout.
Deadman Creek	Rearing and survival of cutthroat trout, rainbow trout, cutthroat x trout. Sport fishery.
Big Sheep Creek	Survival and rearing of rainbow trout and brown trout. Sport fishery. Major recreation area.
North Fork Greenhorn Creek	Survival and rearing of brook trout, westslope cutthroat trout.
Jones Creek	Spawning, rearing, and survival of westslope cutthroat trout.
Peet Creek	Spawning, rearing, and survival of westslope cutthroat trout.
Corral Creek	Spawning, rearing, and survival of brook trout, Yellowstone cutthroat trout. Historic Arctic grayling habitat.

Odell Creek	Spawning, rearing, and survival of westslope cutthroat trout. Historic Arctic grayling habitat.
Long Creek	Spawning, rearing, and survival of cutthroat trout, brook trout. Historic Arctic grayling habitat.
Hellroaring Creek	Spawning, rearing, and survival of brook trout, cutthroat trout. Historic Arctic grayling habitat. Sport fishery.
Tom Creek	Spawning, rearing, and survival of brook trout. Historic Arctic grayling habitat.
East Fork Blacktail Deer Creek	Survival and rearing of brook trout, rainbow trout, mountain whitefish. Sport fishery. Major riparian dependent wildlife values.
West Fork Blacktail Deer Creek	Survival and rearing of brook trout. Riparian dependent wildlife values.

(Bd. Exh. 38-A, pp.2-6; BLM Exh. 4, pp. 13-76.)

10. The westslope cutthroat trout, once common throughout the Upper Missouri River drainage is classified as a species of special concern in Montana. (BLM Exh. 4, p. 35.)

11. Westslope cutthroat trout are very intolerant of environmental disturbances and habitat changes, are poor competitors with introduced species, readily hybridize with rainbow trout and are highly susceptible to fishing pressure. These factors have combined to greatly reduce the native westslope cutthroat population of the Upper Missouri drainage. (Bd. Exh. 38-A, p. 39.)

12. Twelve of the streams with BLM application for reservation have populations of westslope cutthroat trout. (BLM Exh. 10, Bozorth Dir., p. 4.)

13. The population of fluvial Arctic grayling is in decline and the Big Hole River drainage is the habitat for the last remaining population of fluvial grayling in the lower 48 United States. (BLM Exh. 12, p. 1.)

14. The Arctic grayling population of the Big Hole River drainage is continuing a decline that threatens their continued viability. (BLM Exh. 12, p. 4.)

15. The values of riparian areas adjacent to the streams on which reservations are sought includes diversity of plant and wildlife species, water purification, flood mitigation, and recreational opportunities. (Bd. Exh. 38-A, p. 9.)

16. The riparian areas of the streams applied for include over 40 species of birds, 17 species of mammals, and 4 reptile and amphibian species. Many species of special concern as well as the peregrine falcon, bald eagle, and grizzly bear make use of these riparian areas. (Bd. Exh. 38-A, p. 9.)

17. Instream flows are needed in order to protect areas of food production in streams, and to insure that fish have access to cover or shelter. Flows are also needed for favorable spawning and rearing conditions. (BLM Exh. 4, pp. 3-5.)

18. Riffles are the area of a stream that are most affected by low flows. Flows that maintain suitable riffles also maintain suitable pools and runs. (BLM Exh. 5.)

19. The wetted perimeter method of determining flows needed for fishery purposes determines a range of instream flows relating to the width of the wetted perimeter of a stream bottom in selected riffle areas. There are generally two inflection points. Flows above the upper inflection point have less effect on wetted perimeter. The area for food production is considered near optimal at this upper inflection point. (BLM Exh. 4, p. 2.)

20. At flows below the upper inflection point the stream pulls away from the riffle bottom. At the lower inflection point the rate of loss of wetted perimeter accelerates and the area available for food production decreases rapidly. Flows below the lower inflection point are undesirable based on impacts on food, cover, and habitat. Flows above the upper inflection point provide near optimal trout habitat. (BLM Exh. 4, pp. 3, 5.)

21. In general only streams with exceptional resident fish populations or those providing crucial spawning and/or rearing habitat or those with the presence of species of special concern (Westslope Cutthroat or fluvial Arctic Grayling) warrant an upper inflection point reservation. (BLM Exh. 4, p. 7.)

22. In general a poor fish population would justify a flow at the low inflection point. (BLM Exh. 4, p. 7.)

23. Upper inflection points were calculated for each stream as set forth in the application by a fully qualified fisheries biologist with training in wetted perimeter method. (Bd. Exh. 38-A.)

24. The wetted perimeter and discharge relationships for a stream is a suitable method to determine instream flow amounts

needed for fisheries in the streams of Montana. (BLM Exh. 11, p. 3.)

25. Several recent independent evaluations of the wetted perimeter inflection point method have led to the conclusion that the method produces accurate minimum flow recommendations. (BLM Exh. 3, Bierbach Dir., p. 4.)

26. Channel maintenance flows are discharges necessary to maintain the form and characteristics of existing streams for their proper functioning. Reductions in streamflow can result in streambed migration. Fish spawning beds and riparian vegetation directly benefit from bankfall discharges. (BLM Exh. 3, Bierbach Dir., p. 4.)

28. The instantaneous peak discharge for a two-year recurrence interval is suitable for channel maintenance. This discharge closely approximates the bankfall discharge. (BLM Exh. 3, Bierbach Dir., p. 5.)

29. The channel maintenance flows requested by BLM are set forth in the application. They were prepared by a qualified hydrologist using acceptable scientific methods. (Bd. Exh. 40; BLM Exh. 6, pp. 1, 2.)

30. In Deep Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow request. DFWP measurements indicated the inflection point as 18 cfs. (Bd. Exh. 37-A.2, p. 2-297.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 30 cfs. (Bd. Exh. 38-A, p. 12.) The 18 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

31. In Cabin Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Tr. Day 13, Bierbach Dir., p. 146.) DFWP measurements indicate the upper inflection point for Cabin Creek is .4 cfs. (Bd. Exh. 37-A.2, p. 58.) The .4 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

32. In West Fork Blacktail Deer Creek the amount determined by the DFWP as the low inflection point more accurately reflects the instream flow needed because of the lower fishery values. (Bd. Exh. 37-A.2, p. 2-130.) The lower inflection point on West Fork Blacktail Deer Creek is 1 cfs. (Bd. Exh. 37-A.2, p. 2-132.)

33. In East Fork Dyce Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow

request. DFWP measurements indicated the inflection point as 1.4 cfs. (Bd. Exh. 37-A.2, p. 2-219.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 1.5 cfs. (Bd. Exh. 38-A, p. 12.) The 1.4 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

34. In Indian Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for Indian Creek is .2 cfs. (Bd. Exh. 37-A.2, p. 2-55.) The .2 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

35. In Jones Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow request. DFWP measurements indicated the inflection point as 1.9 cfs. (Bd. Exh. 37-A.2, p. 2-42.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 2.0 cfs. (Bd. Exh. 38-A, p. 12.) The 1.9 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

36. In Rape Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for Rape Creek is .4 cfs. (Bd. Exh. 37-A.2, p. 2-89.) The .4 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

37. In Long Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow request. DFWP measurements indicate the inflection point as 3.4 cfs. (Bd. Exh. 37-A.2, p. 2-48.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 5.0 cfs. (Bd. Exh. 38-A, p. 12.) The 3.4 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

38. In Shenon Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for Shenon Creek is .4 cfs. (Bd. Exh. 37-A.2, p. 2-76.) The .4 cfs figure is an

accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

39. In Peet Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow request. DFWP measurements indicated the inflection point as .9 cfs. (Bd. Exh. 37-A.2, p. 2-45.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 1.5 cfs. (Bd. Exh. 38-A, p. 12.) The .9 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

40. In Simpson Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for Simpson Creek is .7 cfs. (Bd. Exh. 37-A.2, p. 2-62.) The .7 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

41. In Tom Creek both BLM and DFWP have applied the wetted perimeter method to derive their instream flow request. DFWP measurements indicated the inflection point as 1.4 cfs. (Bd. Exh. 37-A.2, p. 2-35.) BLM measurements (prepared earlier under contract by DFWP) indicated the inflection point as 2.0 cfs. (Bd. Exh. 38-A, p. 12.) The 1.4 cfs figure is the more accurate measurement of the upper inflection point and no reservation in excess of the upper inflection point is justified. (Tr. Day 13, p. 164.)

42. In Trapper Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1 cfs and BLM rounded up their application to 1 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for Trapper Creek is .7 cfs. (Bd. Exh. 37-A.2, p. 2-58.) The .7 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

43. In West Fork Dyce Creek the BLM applied the wetted perimeter method to derive their instream flow request. The upper inflection point was less than 1.4 cfs and BLM rounded up their application to 1.4 cfs. (Bierbach Dir., Tr. Day 13, p. 146.) DFWP measurements indicate the upper inflection point for West Fork Dyce Creek is .7 cfs. (Bd. Exh. 37-A.2, p. 2-115.) The .7 cfs figure is an accurate measurement of the upper inflection point and no reservation in excess of that amount is justified.

44. Except as set forth above in Findings of Fact 30 through 43, the amount of water applied for by the BLM is the amount needed to fulfill the purposes of the reservation. Otherwise, the amounts set forth in Findings of Fact 30 through 43 are the amounts needed to fulfill the purposes of the reservation.

45. The actual discharges were calculated from an equation developed from similar gauged streamflows in western Montana. (BLM Exh. 3, Bierbach Dir., pp. 5, 21.)

46. There is one stream in BLM's application where the instream annual flow reservation request may exceed 50% of the average annual flow of record at a gauged site. (Bd. Exh. 38-A, p. 14.)

47. Big Sheep Creek is a gauged stream where the 50% limit would limit the amount applied for. The average annual flow of Big Sheep Creek is 65 cfs. (Bd. Exh. 40, p. 13.) Fifty percent of the average annual flow is 32.5 cfs. (Bd. Exh. 41, p. 58.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY BUREAU OF LAND MANAGEMENT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

48. The direct benefits of reserving the requested instream flows include helping preserve the fisheries resource and the continuation of fishing opportunities, recreational opportunities and maintenance of existing riparian communities. (BLM Exh. 3, Bierbach Dir., pp. 5-6.)

49. Eight species of special concern and three threatened or endangered species reside in streams where reservations were requested. (BLM Exh. 3, Bierbach Dir., p. 6.)

50. Instream flows allow establishment or continued existence of highly productive riparian zones. (Bd. Exh. 10, p. 3.)

51. Instream flows maintain existing habitat for elk, moose, and deer near the stream reaches. (Bd. Exh. 38-A, p. 15.)

52. Direct costs to BLM would be administrative costs to monitor future permit application and assess their impact upon reservations. (Bd. Exh. 38-A, p. 15.)

53. There are no proposals for irrigation, mining, or hydroelectric projects that conflict with the proposed reservations. (Bd. Exh. 38-A, p. 15.)

54. Instream flow reservations may have some minor indirect costs to existing water users if the reservants object to changes

in existing rights. All junior water right holders including reservants have the right to object to changes in existing rights. (BLM Exh. 14, p. 3.) Such objections do impact existing water rights by allowing the reservant to object to changes. (DFWP Exh. 11, p. 7.)

55. Reservants objections, if any, may increase transaction costs for existing water rights holders who wish to transfer or otherwise change water rights. (Duffield Cross, Tr. Day 10, p. 17.)

56. An objection may in some cases, prevent a change from occurring but only if protected instream flows are adversely affected as a result of the change. (Mont. Code Ann. § 85-2-402.)

57. Objectors to BLM instream reservations have not quantified any indirect cost to existing water rights holders which would result from granting the instream flow reservation. (Duffield Cross, Tr. Day 10, pp. 67, 171.)

58. There are indirect costs that result to existing water right holders by granting instream reservations. These costs have not been quantified by the applicant.

59. The direct and indirect costs of granting the instream flow requests where there are no competing reservations applied for are negligible.

60. For BLM's instream flow reservation the benefits and costs to be considered may be summarized as follows:

Direct Benefits	Fish, wildlife and recreation, riparian protection
Indirect Benefits	Hydropower, water quality
Direct Cost	BLM enforcement
Indirect Cost	Foregone water consumption for irrigation or other uses Economic opportunity costs to parties other than the reservant

(Bd. Exh. 38-A, pp. 13, 15.)

61. A no-action alternative to granting instream flow reservations could result in costs to recreation, fish, and wildlife, water quality, and other economies. (BLM Exh. 3, Bierbach Dir., p. 2.)

62. Other alternative actions could be taken to improve or protect instream flows, such as intensification of water conservation measures, leasing of water rights, constructing offstream storage facilities, conditioning water permits, closing basins and applying the public trust doctrine. (DFWP Exh. 38, pp. 75-84.)

63. These alternatives are either more costly, limited in applicability, legally untested or logistically infeasible for basin-wide utilization. (DFWP Exh. 37, Knudson Dir., p. 15; BLM Exh. 14, p. 3.)

64. There are no other reasonable alternatives with greater net benefits. (Bd. Exh. 41, pp. S-8, 34.)

65. Depending on the location, timing, and amount of water diverted, new water use permits could cause an irretrievable loss of water quality, fisheries, and opportunities for recreation. (Bd. Exh. 40, p. 244.)

66. Incremental streamflow depletions will continue to reduce critical components of the natural environment, including fishery resources, wildlife riparian areas and water quality. (DFWP Exh. 38, p. 73.)

67. Reservations for instream flow are the only way to protect streamflow for water quality, fisheries and recreation on nearly all streams where such reservations are requested. (Bd. Exh. 40, p. 244.)

68. BLM's instream flow reservation would not have adverse impacts to public health, safety and welfare. (Bd. Exh. 40, pp. 243-244.)

69. In general, the impacts to public health, safety and welfare from BLM instream flow reservations are positive and beneficial. (Bd. Exh. 40, pp. 243-244.)

70. The instream flows requested by BLM as modified by the Board are necessary to maintain the existing resident fish populations, to provide passage for migratory fish species in certain streams, to protect spawning and rearing habitats of both resident and migratory species, to protect the habitats of "Species of Special Concern" such as the Westslope Cutthroat trout, Arctic Grayling. The flows are also necessary to help protect the habitat for those wildlife species which depend on the streams and their riparian zones for food, water and shelter, including the bald eagle, peregrine falcon, whooping crane and grizzly bear, all of which are threatened or endangered species. (Bd. Exh. 38-A.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY BUREAU OF RECLAMATION IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

71. The BLM has submitted a management plan for instream flow reservation. (Bd. Exh. 38-A, p. 16.)

72. The management plan does not foresee continuous gauging of BLM reservation because the streams are small headwater streams that present economic and practical problems in gauging. (Bd. Exh. 38-A, p. 16.)

73. A change in use that decreases flows at the bottom of a reach could adversely affect an instream reservation.

74. BLM will monitor operation applications and inventory and manage riparian areas in conjunction with the instream flows. (Bd. Exh. 38-A, p. 116.)

75. Further information concerning streamflows above the monitoring point will be needed before the instream flow reservation can be adequately monitored and enforced.

76. Because the flows applied for are at a particular point, in order to effectively monitor changes requested by senior water users, additional information will be needed so that the BLM can respond on a case-by-case method.

77. A change by a senior appropriator occurring within a reach or a change that affects a reach could adversely affect instream flow in that reach.

78. BLM is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

79. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

80. In those steams and stream reaches where BLM's instream flow reservations overlap with DHES' instream requests, all such reservations should be concurrent, rather than cumulative. (Bd. Exh. 40, p. 11; Bd. Exh. 41, p. 68.)

81. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order and the public interest in protecting municipal reservations with a July 1, 1985 priority date outweigh the values protected by the BLM reservation.

82. The water reservation as modified and conditioned herein would not adversely affect any water right with a priority date before July 1, 1985. (Mont. Code Ann. § 85-2-316(9)(e) ARM 36.16.107B(8).)

III. CONCLUSIONS OF LAW

1. BLM is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the BLM's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the BLM application has been established. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).) Specifically, BLM has demonstrated that there is a reasonable likelihood that future in-state competing water uses would consume, degrade and otherwise affect the water available for the purpose of BLM's reservation and BLM has demonstrated the water resource values warrant reserving water for the requested purpose.

4. The methodologies used by BLM are generally accurate and suitable. (ARM 36.16.107B(3)(a).) The BLM has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. §85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The benefits of granting these instream flows as limited greatly exceed the direct and indirect costs. Upon a weighing and balancing, it has been established to the satisfaction of the Board that the water reservation requested by the Bureau of Land Management as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter, any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

9. This reservation does not guarantee minimum flows.

IV. ORDER

1. Subject to all applicable modifications, conditions, and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and C attached to this Order) the application of the BLM is granted as set forth in Table 2.

2. Relative to other reservations the priority date of the BLM shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, and DFWP. It shall be prior to all other reservations granted to Conservation Districts and the reservation granted to Bureau of Reclamation.

3. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

4. BLM shall within two years of the date of the Final Order submit to the Board a list of monitoring sites and a method of determining the extent of the instream flow along the reach proportional to the monitoring site. Until approval of this monitoring report the BLM may not object to any changes of use by other users within a reach.

5. The BLM instream flow reservation shall run concurrently with and overlap rather than run consecutively with any other non-consumptive water rights including but not limited to all hydropower rights and other instream flow reservations.

6. The BLM reservation shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and for any class of uses for which permit applications are precluded.

TABLE 2
SUMMARY OF RESERVATIONS GRANTED TO THE
BUREAU OF LAND MANAGEMENT

STREAM	LOCATION	STREAM MILES WITHIN PUBLIC LANDS	YEAR-ROUND AMOUNT (CFS)	INSTANTANEOUS PEAK DISCHARGE AMOUNT (CFS)
Deep Creek	T2N-R12W-S20	.9	18	500
Bear Creek	T2N-R12W-S34	1.1	2.5	50
Canyon Creek	T2S-R9W-S6	.9	5.0	110
Moose Creek	T2S-R9W-S13&23 T1S-R8W-S7,8,9&18	5.5	8	70
Camp Creek	T2S-R8W-S2,9, 10,11,17,19&20	6.5	5	50
Willow Creek	T4S-R9W-S31&32	1.9	12	130
East Fork Dyce Creek	T6S-R12W-S14, 23,26&35	3.75	1.4	9
West Fork Dyce Creek	T6S-R12W-S14, 22,23&26	3.8	.7	5
Bloody Dick Ck.	T9S-R15W-S23	1	20	270
Medicine Lodge Creek	T12S-R12W-S13 T13S-R12W-S2&26	1	9	50
Rape Creek	T10S-R13W-S21&28	1	.4	5
Shenon Creek	T10S-R13W-S29,30, 32&33; T10S-R14W-S25	3.5	.4	13
Black Canyon Creek	T11S-R14W-S19,20, 21	2.8	2.5	35
Bear Creek (Horse Prarie Creek Drainage)	T10S-R15W-S34	1.3	1	50
Trapper Creek	T10S-R15W-S34	1.3	.7	10
Frying Pan Ck.	T10S-R25W-S22,27&28	1	1.5	35

TABLE 2 (cont.)

STREAM	LOCATION	STREAM MILES WITHIN PUBLIC LANDS	YEAR-ROUND AMOUNT (CFS)	INSTANTANEOUS PEAK DISCHARGE AMOUNT (CFS)
Cabin Creek	T14S-R12W-S1&12	1.3	.4	4
Indian Creek	T14S-R12W-S24	1.3	.2	5
Simpson Creek	T14S-R12W-S25&30	0.8	.7	5
Deadman Creek	T15S-R10W-S22	2.0	4.5	50
Big Sheep Ck.	T13S-R9W-S30 T13S-R10W-S25,35&36 T14S-R10W-S2,10,15,22&34 T15S-R10W-S3,10&22	10.0	32.5	300
North Fork Greenhorn Creek	T8-R4W-S13&24	1.3	3.5	35
Jones Creek	T14S-R3W-S33	1.1	1.9	20
Peet Creek	T15S-R4W-S3&10 T14S-R4W-S34	2.25	.9	30
Corral Creek	T14S-R1E-S22&27	1.5	2.5	20
Odell Creek	T14S-R1W-S31	0.8	11	225
Long Creek	T13S-R4W-S1&2	3.9	3.4	110
Hellroaring Ck.	T14S-R1E-S35&26	0.75	15	250
Tom Creek	T14S-R1E-S32	1.2	1.4	25
East Fork Blacktail Deer Creek	T11S-R5W-S27,34&35	3.4	18	215
West Fork Blacktail Deer Creek	T12S-R6W-S35	2.5	1	25

Application of Big Sandy Conservation District
Water Reservation No. 72256-41P

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF BIG SANDY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a)).

1. The Big Sandy Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 18-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Big Sandy Conservation District has applied to reserve an annual amount of 46,188 acre feet of water to be diverted at a maximum rate of 300 cfs to provide irrigation for 3 projects totaling 19,901 acres. (Bd. Exh. 18-A, p. 4-12.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Big Sandy Conservation District.

3. The Big Sandy Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 18-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3.) (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Big Sandy Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin (Bd. Exh. 18-A, pg. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Big Sandy Conservation District has established methodologies used in determining the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 18-A, p. 8-12; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY BIG SANDY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs.)

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation

Hydropower
Water quality
Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Big Sandy Conservation District were found to be $7.54 per acre-foot of water. This figure takes into account power generated in Montana, not power generated downstream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
BSS-2	-8.23	7.54	-15.76
BS-31	3.00	7.54	-4.54
BS-32	3.72	7.54	-3.82

30. Based on this analysis, the expected net benefits of none of the projects exceed costs of that project.

31. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

III. CONCLUSIONS OF LAW

1. Big Sandy Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Big Sandy Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Big Sandy Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Big Sandy Conservation District are suitable and accurate. Big Sandy Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Big Sandy Conservation District has not established that its water reservation is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

7. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. The reservation application of Big Sandy Conservation District is denied.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF BROADWATER CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Broadwater Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 19-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY BROADWATER CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Broadwater Conservation District has applied to reserve an annual amount of 46,514 acre feet of water to be diverted at a maximum rate of 322 cfs to provide irrigation for 24 projects totaling 15,187 acres. (Bd. Exh. 19-A, p. 4.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Broadwater Conservation District.

3. The Broadwater Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 19-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3).) (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY BROADWATER CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Broadwater Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 19-A, pg. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY BROADWATER CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Broadwater Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable (Bd. Exh. 19-A, p. 12-30; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY BROADWATER CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel Dir., p. 12; Bd. Exh. 40, p. 230.)

27. Projects in the Broadwater Conservation District can be divided into two classes: 1)those in the Jefferson River drainage; and 2) those along the Missouri River, Canyon Ferry reservoir, and Missouri River tributaries. After a review of all factors, hydropower values for each acre-foot of water consumed in the Broadwater Conservation District are $33.09 per acre-foot for waters in the Jefferson drainage, and $31.06 per acre-foot in the rest of the district. The figures take into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
BR-52	30.75	33.09	-2.34
BR-101	16.43	33.09	-16.66
BR-5	8.76	31.06	-22.30
BR-11	14.64	31.06	-16.42
BR-12	4.90	31.06	-26.16
BR-14	7.78	31.06	-23.28
BR-28	10.99	31.06	-20.07

BR-29	5.54	31.06	-25.52
BR-34	35.08	31.06	4.02
BR-35	11.86	31.06	-19.20
BR-38	55.44	31.06	24.38
BR-40	14.94	31.06	-16.12
BR-41	15.89	31.06	-15.17
BR-42	25.53	31.06	-5.53
BR-44	-8.00	31.06	-23.06
BR-50	26.38	31.06	-4.68
BR-103	25.24	31.06	-5.64
BR-104	-22.76	31.06	-53.82
BR-106	11.74	31.06	-19.32
BR-107	10.63	31.06	-20.43
BR-108	14.77	31.06	-16.29
BR-109	3.59	31.06	-27.47
BR-110	8.65	31.06	-22.41
BR-111	-0.10	31.06	-31.16

30. Based on this analysis, the expected net benefits of the following projects exceed their costs: BR-34 and BR-38.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 31 as having a net value less than zero, and granting all instream flow reservations priority over the irrigation projects identified in Findings of Fact 29 results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 19-A, p. 26-27.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 19-A, p. 18-23 and F1-F5; Bd. Exh. 19-C, pp. 9-12b.)

35. There are adverse effects to other resources that may result from development of some of these projects. (Bd. Exh. 19-C, Table 8; Bd. Exh. 40, pp. 192, 199, 204-206, 219, 225 and 226; DFWP Exh. 3, pp. 22-24; Tr. Day 4, pp. 48-66, 81-88, 94 and 95.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Broadwater Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 19-A, pp. 49-58) as required by ARM 36.16.107B(7).)

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

42. As conditioned, and subject to existing water rights with an earlier priority date, the Broadwater Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

43. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Broadwater Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Broadwater Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Broadwater Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for

the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Broadwater Conservation District are suitable and accurate. Broadwater Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Broadwater County Conservation District is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Broadwater Conservation District is granted for the following projects: BR-34 and BR-38. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Broadwater Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 606 acre-feet at a flow rate not to exceed 4.4 cfs to serve a total of 330 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Broadwater Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of

Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Broadwater Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF CASCADE COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Cascade County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 20-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY CASCADE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Cascade County Conservation District has applied to reserve an annual amount of 22,350 acre feet of water to be diverted at a maximum rate of 82.0 cfs to provide irrigation for 52 projects totaling 9,429 acres. (Bd. Exh. 20-A, p. 6.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Cascade County Conservation District.

3. The Cascade County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 20-A, p. 8.) Irrigation is a beneficial use as defined by ARM 36.16.102(3).) (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY CASCADE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Cascade County Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 20-A, p. 9.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY CASCADE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Cascade County Conservation District has established methodologies used in determining the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 20-A, p. 11-17; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY CASCADE COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. Projects in the Cascade County Conservation District can be divided into two classes: 1) those areas of the district above Great Falls where hydropower values are $20.20 per acre-foot, and 2) those areas of the district below Great Falls where hydropower values are $7.54 per acre-foot. These figured take into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water (Findings of Fact 25).

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
CS-42	47.89	7.54	40.35
CS-43	49.74	7.54	42.20
CS-44	35.72	8.54	27.18
CS-159	23.99	8.54	15.45
CS-21	1.53	20.20	-18.67
CS-31	12.86	20.20	-7.34
CS-32	5.06	20.20	-15.14
CS-51	4.93	20.20	-15.27
CS-52	19.91	20.20	-0.29
CS-61	45.28	20.20	25.08

CS-62	31.17	20.20	10.97
CS-63	31.42	20.20	11.22
CS-64	22.49	20.20	2.29
CS-71	17.34	20.20	-2.86
CS-101	52.34	20.20	32.14
CS-102	39.32	20.20	19.12
CS-111	42.42	20.20	22.23
CS-171	22.80	20.20	2.60
CS-231	1.91	20.20	-18.29
CS-241	38.23	20.20	18.03
CS-251	20.87	20.20	0.67
CS-252	34.21	20.20	14.01
CS-271	45.23	20.20	25.03
CS-331	27.21	20.20	7.01
CS-351	33.56	20.20	13.36
CS-471	18.61	20.20	-1.59
CS-541	39.17	20.20	18.97
CSI-11	38.06	20.20	17.86
CSI-12	25.55	20.20	5.35
CSI-21	32.85	20.20	12.65
CSI-22	36.41	20.20	16.21
CSI-23	23.34	20.20	3.14
CSI-31	25.25	20.20	5.05
CSI-32	6.53	20.20	-13.67
CSI-33	13.00	20.20	-7.20
CSI-34	22.75	20.20	2.55
CSI-35	31.80	20.20	11.60
CSI-41	34.47	20.20	14.27
CSI-51	46.14	20.20	25.94
CSI-52	55.05	20.20	34.85
CSI-71	24.55	20.20	4.35
CSI-81	31.04	20.20	10.84
CSI-82	29.36	20.20	9.16
CSI-83	49.91	20.20	29.71
CSI-91	29.14	20.20	8.94
CSI-92	29.92	20.20	9.72
CSI-101	48.74	20.20	28.54
CSI-102	41.18	20.20	20.98
CSI-103	49.92	20.20	29.72
CSI-111	28.30	20.20	8.10
CSI-120	12.35	20.20	-7.85
CSI-200	-12.39	20.20	-32.59

30. Based on this analysis, the expected net benefits for projects CS-42, CS-43, CS-44, CS-159, CS-61, CS-62, CS-63, CS-64, CS-101, CS-102, CS-111, CS-171, CS-241, CS-251, CS-252, CS-271, CS-331, CS-351, CS-541, CSI-11, CSI-12, CSI-21, CSI-22, CSI-23, CSI-33, CSI-34, CSI-35, CSI-41, CSI-51, CSI-52, CSI-71, CSI-81, CSI-82, CSI-83, CSI-91, CSI-92, CSI-101, CSI-102, CSI-103, and CSI-111 are likely to exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over the irrigation projects identified in Findings of Fact 29 results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 20-A, pp. 26-27).

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 20-A, pp. 13, 24, 26 and 27; Bd. Exh. 20-C, pp. 11-18.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 20-C, Table 10, pp. 24-26; Bd. Exh. 40, pp. 193, 206-208 and 227; DFWP Exh. 4, pp. 2, 3, 6-15 ; Tr. Day 4, pp. 106-112, 115-119, 126 and 127.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Cascade County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 20-A, pp. 28-32) as required by ARM 36.16.107B(7).)

39. Cascade County Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5).)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Cascade County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Cascade County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Cascade County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Cascade County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Cascade County Conservation District are suitable and accurate. Cascade County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Cascade County Conservation District is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a

reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Cascade County Conservation District is granted for the following projects: CS-42, CS-43, CS-44, CS-159, CS-61, CS-62, CS-63, CS-64, CS-101, CS-102, CS-111, CS-171, CS-241, CS-251, CS-252, CS-271, CS-331, CS-351, CS-541, CSI-11, CSI-12, CSI-21, CSI-22, CSI-23, CSI-33, CSI-34, CSI-35, CSI-41, CSI-51, CSI-52, CSI-71, CSI-81, CSI-82, CSI-83, CSI-91, CSI-92, CSI-101, CSI-102, CSI-103, and CSI-111. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Cascade County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 9314 acre-feet at a flow rate not to exceed 71.9 cfs to serve a total of 3910 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Cascade County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and the United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts shall have priority over the reservation granted to the United States Department of the Interior, Bureau of Reclamation.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Cascade County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source

of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF CHOUTEAU COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Chouteau County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 21-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY CHOUTEAU COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Chouteau County Conservation District has applied to reserve an annual amount of 75,999 acre feet of water to be diverted at a maximum rate of 494 cfs to provide irrigation for 26 projects totaling 32,264 acres. (Bd. Exh. 21-A, p. 6.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Chouteau County Conservation District.

3. The Chouteau County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 21-A, p. 7.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY CHOUTEAU COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Chouteau County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 21-A, p. 10 and 11.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY CHOUTEAU COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Chouteau County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 21-A, pp. 12-16; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY CHOUTEAU COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tubbs Cross, Tr. Day 3, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exh. 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel Dir., p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values for water in the Chouteau County Conservation District are $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
CH-21	53.19	7.54	45.65
CH-181	0	NA	NA
CH-201	36.05	7.54	28.52
CH-211	14.90	7.54	7.37
CH-371	-1.16	7.54	-8.70
CH-381	-0.41	7.54	-7.95
CH-511	-1.17	7.54	-8.71
CH-541	8.30	7.54	0.76
CH-551	50.29	7.54	42.76
CH-641	-19.09	7.54	-26.63
CHI-10	28.88	7.54	21.34
CHI-21	36.37	7.54	28.83

CHI-22	31.38	7.54	23.84
CHI-30	36.11	7.54	28.58
CHI-40	28.70	7.54	21.16
CHI-51	44.21	7.54	36.67
CHI-52	24.24	7.54	16.70
CHI-53	53.79	7.54	46.26
CHI-61	89.10	7.54	81.56
CHI-72	62.03	7.54	54.49
CHI-74	56.52	7.54	48.98
CHI-80	65.78	7.54	58.24
CHS-1	-8.39	7.54	-15.93
CHS-3	15.38	7.54	7.84
CHS-5	8.33	7.54	0.80
CHS-6	-9.92	7.54	-17.45

30. Based on this analysis, net benefits exceed costs for projects CH-21, CH-201, CH-211, CH-541, CH-551, CHI-10, CHI-21, CHI-22, CHI-30, CHI-40, CHI-51, CHI-52, CHI-53, CHI-61, CHI-72, CHI-74, CHI-80, CHS-3 and CHS-5. However, there is only limited water available in the Teton River. (Bd. Exh. 40, p. 166-169; Reichelt Exh. 1; Tr. Day 3, pp. 295-310.) Projects CHI-72, CHI-74, and CHI-80 on the Teton River are not financially feasible when water is only available in 6 years out of 10. (Board Exh. 21-C, Table 6.) Therefore, benefits do not exceed costs for projects CHI-72, CHI-74 and CHI-80.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 21-A, pp. 26-27.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 21-A, p. 14, 25, 163 and 164; Bd. Exh. 21-C, p. 19-22.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 21-C, Table 9, p. 19-22; Bd. Exh. 40, p. 194, 208, 209, 222, 228 and 229; DFWP Exh. 4, p. 15 and 17-21; DFWP-5, p. 1-6; Tr. Day 4, p. 130-132.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Chouteau County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 21-A, pp. 29-32) as required by ARM 36.16.107B(7).)

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

42. As conditioned, and subject to existing water rights with an earlier priority date, the Chouteau County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

43. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Chouteau County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Chouteau County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Chouteau County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Chouteau County Conservation District are suitable and accurate. Chouteau County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. It has been established to the satisfaction of the Board that the amount requested by Chouteau County Conservation District as modified and conditioned herein is needed to fulfill the purpose of the reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii); ARM 36.16.107B(3).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhs. A and B attached to this order) the application of the Chouteau County Conservation District is granted for the following projects: CH-21, CH-201, CH-211, CH-541, CH-551, CHI-10, CHI-21, CHI-22, CHI-30, CHI-40, CHI-51, CHI-52, CHI-53, CHI-61, CHS-3 and CHS-5. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Chouteau County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 33,123 acre-feet at a flow rate not to exceed 218.8 cfs to serve a total of 14,119 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Chouteau County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Chouteau County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF FERGUS COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a)).

1. The Fergus County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 22-A, p. 2).

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY FERGUS COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Fergus County Conservation District has applied to reserve an annual amount of 12,604 acre feet of water to be diverted at a maximum rate of 108 cfs to provide irrigation for 17 projects totaling 7,283 acres. (Bd. Exh. 22-A, pp. 8 and 17). The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Fergus County Conservation District.

3. The Fergus County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 22-A, p. 8). Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248).

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY FERGUS COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Fergus County Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 22-A, pp. 10 and 11).

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248).

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY FERGUS COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3)).

5. The Fergus County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 22-A, p. 12-16; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY FERGUS COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4).

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6).

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35). For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35). The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Fergus County Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.). The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
FE-41	-4.83	7.54	-12.37
FE-42	-5.28	7.54	-12.81
FE-81	-2.41	7.54	-9.95
FE-111	0.56	7.54	-6.97
FE-141	41.48	7.54	33.94
FE-161	40.26	7.54	32.37
FE-401	17.36	7.54	9.83
FE-431	24.57	7.54	17.04
FE-561	-11.36	7.54	-18.90
FE-671	28.04	7.54	20.50
FE-672	38.04	7.54	30.51
FE-673	31.07	7.54	23.53

FEI-10	24.65	7.54	17.11
FEI-20	5.22	7.54	-2.32
FEI-30	6.26	7.54	-1.27
FEI-40	11.44	7.54	3.91
FEI-50	-3.86	7.54	-11.38

30. Based on this analysis, the expected net benefits for projects FE-141, FE-161, FE-401, FE-431, FE-671, FE-672, FE-673, FEI-10, and FEI-40 exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 22-A, pp. 26-27).

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 22-A, pp. 14, 24, 109 and 110; Bd. Exh. 22-C, pp. 5-11).

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 22-C, Table 9, and p. 17; Bd. Exh. 40, p. 212),

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8)).

38. The Fergus County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 22-A, pp. 28-32) as required by ARM 36.16.107B(7).

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7)).

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6)).

41. As conditioned, and subject to existing water rights with an earlier priority date, the Fergus County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Fergus County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).

2. The purpose of the Fergus County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).

3. The need for the Fergus County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The methodologies and assumptions used by the Fergus County Conservation District are suitable and accurate. Fergus County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Fergus County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative

priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation.(Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Fergus County Conservation District is granted for the following projects: FE-141, FE-161, FE-401, FE-431, FE-671, FE-672, FE-673, FEI-10, and FEI-40. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Fergus County Conservation District for those particular projects and by reference are made a part of this Order.The total amount of water reserved for this applicant is 3914 acre-feet at a flow rate not to exceed 33.7 cfs to serve a total of 2314 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Fergus County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Fergus County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any

basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

Application of Gallatin County Conservation District
Water Reservation No. 72587-41G

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF GALLATIN COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Gallatin County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 23-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY GALLATIN COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Gallatin Conservation District has applied to reserve an annual amount of 15,170 acre feet of water to be diverted at a maximum rate of 149 cfs to provide irrigation for 13 projects totaling 10,508 acres. (Bd. Exh. 23-A, pg. 4.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) with the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Gallatin County Conservation District.

3. The Gallatin County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 23-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY GALLATIN COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Gallatin County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 23-A, pp. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or down-stream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY GALLATIN COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Gallatin County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 23-A, p. 12-39; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY GALLATIN COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The benefit-cost factor [ARM 36.16.107B(4)(a)] requires a weighing of the benefits and costs of each reservation application. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower

Water quality
Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values for each acre-foot of water consumed in the Gallatin Conservation District are $33.09 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
GA-13	59.64	33.09	26.55
GA-14	47.08	33.09	13.99
GA-24	51.44	33.09	18.35
GA-35	52.44	33.09	19.35
GA-40	21.29	33.09	-11.80
GA-41	24.68	33.09	-8.41
GA-44	66.45	33.09	33.36
GA-46	52.02	33.09	18.93
GA-79	78.56	33.09	45.47
GA-81	40.00	33.09	6.91
GA-92	53.45	33.09	20.36

GA-102	56.65	33.09	23.56
GA-110	11.95	33.09	-21.14
GA-124	47.17	33.09	14.08
GA-130	15.47	33.09	-17.62
GA-143	22.11	33.09	-10.98
GA-151	51.41	33.09	18.32
GA-201	157.25	33.09	124.16

30. Based on this analysis, net benefits exceed costs for projects GA-13, GA-14, GA-24, GA-35, GA-44, GA-46, GA-79, GA-81, GA-92, GA-102, GA-124, GA-151, and GA-201.

31. Project GA-201 contemplates the irrigation of benchlands with water piped from the Madison River. (Bd. Exh. 23-B, p. 15.)

32. The water used would contain arsenic that would likely have a concentration of from 41 to 95 micrograms per liter and a summertime average of 62 micrograms per liter. (Bd. Exh. 23-B p. 15.)

33. Using the water for irrigation will result in groundwater having up to three times the concentration of arsenic as compared to the water as applied. (DHES Exh. 3, Horpestad Obj., p. 9.)

34. Use of Madison River water with these relatively high concentrations of arsenic would result in soil and water contamination similar to what has occurred in the Madison valley above Three Forks, although on a smaller scale. (DHES Exh. 8, Horpestad Dir., p. 15.)

35. In the area near Three Forks the increased risk from drinking contaminated groundwater exceeds 1 increased cancer case per 100 people. (DHES Exh. 8, Horpestad Dir., p. 15.)

36. It is not in the public interest to transport water with such high levels of contamination into the groundwater or surface water of an adjacent valley. For this reason the net benefits of project GA-201 do not exceed the costs of GA-201.

37. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero, not granting the projects identified in Findings of Fact 29 as having a net value less than zero, not granting a project that is not in the public interest and granting all instream flow reservations priority over all the irrigation projects results in the greatest net benefits to society.

38. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

39. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 23-A, pp. 26-27.)

40. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 23-A, pp. 23-33; Bd. Exh. 23-C, pp. 9-12 and 26-28.)

41. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 23-C, Table 8, pg. 23-25; Bd. Exh. 40, pp. 191, 197, 204 and 225.)

42. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

43. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

44. The Gallatin County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 23-A, pp. 64-73) as required by ARM 36.16.107B(7).)

45. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

46. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

47. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

48. As conditioned, and subject to existing water rights with an earlier priority date, the Gallatin County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

49. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Gallatin County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Gallatin County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Gallatin County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Gallatin County Conservation District are suitable and accurate. Gallatin County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Gallatin County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Gallatin County Conservation District is granted for the following projects: GA-13, GA-14, GA-24, GA-35, GA-44, GA-46, GA-79, GA-81, GA-92, GA-102, GA-124, and GA-151. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Gallatin County Conservation District for those particular projects and by reference are made a part of this Order.The total amount of water reserved for this applicant is 2006 acre-feet at a flow rate not to exceed 20.34 cfs to serve a total of 1764 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Gallatin County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Gallatin County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF GLACIER COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Glacier County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 24-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY GLACIER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Glacier County Conservation District has applied to reserve an annual amount of 1,271 acre feet of water to be diverted at a maximum rate of 11.4 cfs to provide irrigation for 3 projects totaling 703 acres. (Bd. Exh. 24-A, pg. 5 and 13.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) with the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Glacier County Conservation District.

3. The Glacier County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 24-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY GLACIER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Glacier County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 24-A, pg. 8 and 9.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY GLACIER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Glacier County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 24-A, pp. 10-13; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY GLACIER COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Glacier County Conservation District were found to be $7.54 per acre-foot of water. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
GL-11	27.07	7.54	19.53
GL-201	32.98	7.54	25.44
GL-221	32.95	7.54	25.42

30. Based on this analysis, the expected net benefits for projects GL-11, GL-201, and GL-221 are likely to exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and granting all instream flow reservations priority

over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 24-A, pp. 26-27.)

34. For the projects which had benefits exceeding costs water was found to be physically available.(Bd. Exh. 24-A, pg. 11, 12, 19 56 and 57; Bd. Exh. 24-C, pp. 3 and 4.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 24-C, Table 8, pp. 9; Bd. Exh. 40, pp. 208 and 209; DFWP Exh. 4, pp. 17-21.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Glacier County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 24-A, pp. 22-24) as required by ARM 36.16.107B(7).)

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

42. As conditioned, and subject to existing water rights with an earlier priority date, the Glacier County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

43. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Glacier County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Glacier County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Glacier County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Glacier County Conservation District are suitable and accurate. Glacier County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Glacier County Conservation District as conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Glacier County Conservation District is granted for the following projects: GL-11, GL-201, and GL-221. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Glacier County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 1271 acre-feet at a flow rate not to exceed 11.4 cfs to serve a total of 703 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Glacier County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Glacier County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF HILL COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Hill County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 25-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY HILL COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Hill County Conservation District has applied to reserve an annual amount of 2,708 acre feet of water to be diverted at a maximum rate of 18.82 cfs to provide irrigation for 1 projects totaling 1,350 acres. (Bd. Exh. 25-A, pp. 4.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) with the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Hill County Conservation District.

3. The Hill County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 25-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3.) (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY HILL COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Hill County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 25-A, pp. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY HILL COUNTY CONSERVATION DISTRICT (Mont. Code Ann. Section 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Hill County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 25-A, p. 8-11; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY HILL COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Hill County Conservation District were found to be $7.54 per acre-foot of water. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
HI-269	-0.64	7.54	-8.18

30. Based on this analysis, the expected net benefits for this project are less than the costs.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

31. The Hill County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 24-A, pp. 22-24) as required by

ARM 36.16.107B(7).

32. As conditioned, and subject to existing water rights with an earlier priority date, the Hill County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

III. CONCLUSIONS OF LAW

1. Hill County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Hill County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Hill County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Hill County Conservation District are suitable and accurate. Hill County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Broadwater County Conservation District is not in the public interest because its cost exceeds its benefit. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The Board may grant, deny, modify or condition any reservation applied for. (Mont. Code Ann. § 85-2-331(4).) In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316.)

IV. ORDER

1. The application of the Hill County Conservation District is denied.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF JEFFERSON VALLEY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Jefferson Valley Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 27-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY JEFFERSON VALLEY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Jefferson Valley Conservation District has applied to reserve an annual amount of 31,882 acre feet of water to be diverted at a maximum rate of 237 cfs to provide irrigation for 24 projects totaling 12,415 acres. (Bd. Exh. 27-A, pg. 4.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Jefferson Valley Conservation District.

3. The Jefferson Valley Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 27-A, p. 7.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY JEFFERSON VALLEY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Jefferson Valley Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 27-A, pp. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY JEFFERSON VALLEY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Jefferson Valley Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 27-A, pp. 12-30; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY JEFFERSON VALLEY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than reservants

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values for each acre-foot of water consumed in the Jefferson Valley Conservation District are $33.09 per acre-foot of water consumed. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
JV-17	45.78	33.09	12.69
JV-18	43.00	33.09	9.71
JV-25	55.08	33.09	21.99
JV-55	29.67	33.09	-3.42
JV-63	51.15	33.09	18.06
JV-80	41.13	33.09	8.04
JV-81	52.48	33.09	19.39
JV-95	63.46	33.09	30.37
JV-201	25.59	33.09	-7.50
JV-202	44.16	33.09	11.07
JV-203	25.09	33.09	-8.00
JV-204	53.16	33.09	20.07

30. Based on this analysis, net benefits exceed costs for projects JV-17, JV-18, JV-25, JV-63, JV-80, JV-81, JV-95, JV-202, and JV-204.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 27-A, pp. 26-27.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 27-A, pp. 19 and F1-F5; Bd. Exh. 27-C, pp. 6-9.)

35. There are adverse effects to other resources that may result from development of some of these projects. (Bd. Exh. 27-C, Table 8, pp. 15-17 and 19-22; Bd. Exh. 40, pp. 192 and 205; DFWP-3, pp. 8-18; Transcript Day 4, pp. 36-57, 81-85, 94 and 95.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Jefferson Valley Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 19-A, pp. 49-58) as required by ARM 36.16.107B(7).)

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

42. As conditioned, and subject to existing water rights with an earlier priority date, the Jefferson Valley Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

43. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Jefferson Valley Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of Jefferson Valley Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Jefferson Valley Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Jefferson Valley Conservation District are suitable and accurate. Jefferson Valley Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Jefferson Valley Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative

priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Jefferson Valley Conservation District is granted for the following projects: JV-17, JV-18, JV-25, JV-63, JV-80, JV-81, JV-95, JV-202, and JV-204. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Jefferson Valley Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 14,515 acre-feet at a flow rate not to exceed 109.9 cfs to serve a total of 5905 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Jefferson Valley Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Jefferson Valley Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any

basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF JUDITH BASIN CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Judith Basin Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 28-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Judith Basin Conservation District has applied to reserve an annual amount of 2,762 acre feet of water to be diverted at a maximum rate of 26 cfs to provide irrigation for 10 projects totaling 1,511 acres. (Bd. Exh. 28-A, pp. 7 and 16.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Judith Basin Conservation District.

3. The Judith Basin Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 28-A, p. 8.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Judith Basin Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin (Bd. Exh. 28-A, pp. 9 and 10.)

b) The districts desires to improve long-term planning for

its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Judith Basin Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 28-A, p. 11-16; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. As required by Mont. Code Ann. § 85-2-316(4)(a)(iv); and ARM 36.16.107B(4), for the Board to adopt a reservation it must find that it is in the public interest.

7. The benefit-cost factor [ARM 36.16.107B(4)(a)] requires a weighing of the benefits and costs of each reservation application. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. (DFWP Exh. 31, Duffield Dir., p. 4.)

8. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

9. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs

Indirect Costs: Foregone instream uses
- Fish and Wildlife
- Recreation
- Hydropower
- Water quality
- Economic opportunity costs to parties other than reservant

10. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

11. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

12. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

13. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

14. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

15. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

16. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

17. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

18. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

19. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

20. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

21. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

22. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

23. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

24. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

25. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76

Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

26. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

27. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

28. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

29. After a review of all factors, hydropower values in the Judith Basin Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

30. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water (Findings of Fact 28).

31. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
JB-21	13.81	7.54	6.27
JB-61	27.26	7.54	19.72
JB-111	20.79	7.54	13.26
JB-231	11.87	7.54	4.33
JB-232	11.87	7.54	4.33

JB-261	28.90	7.54	21.37
JB-281	45.35	7.54	37.81
JB-309	-0.26	7.54	-7.80
JBI-2	10.62	7.54	3.08
JBS-3	49.72	7.54	42.18

32. Based on this analysis, the expected net benefits for projects JB-21, JB-61, JB-111, JB-231, JB-232, JB-261, JB-281, JBI-2, JBS-3 exceed costs. However, with water available at 8 years out of 10 projects JB-111, JB-231, JB-232, JB-309, and JBI-2 are unlikely to be feasible financially. (Board Exh. 28-C, Table 6.)

33. By definition, "net benefits" mean indirect and direct benefits less indirect and direct costs. Indirect costs include economic opportunity costs that the requested flow reservation mays have to parties other than the reservant. (ARM 36.16.107B(4)(b).) Thus, this factor is similar to the benefit/cost criteria upon which findings of fact have been made above.

34. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 35 as having a net value greater than zero with financial feasibility that is likely and not granting the projects identified in Findings of Fact 35 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

35. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

36. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 28-A, pp. 26-27.)

37. For the projects which had benefits exceeding costs and financial feasibility water was found to be physically available. However on Running Wolf Creek there is water physically available for only one project. (Bd. Exh. 28-A, pp. 14, 24, 109 and 110; Bd. Exh. 28-C, pp. 5-11.) It would not be in the public interest to grant a reservation for a consumptive use when the reservation could never be exercised. Of the two projects on Running Wolf Creek JBS-2 is the more feasible. Therefore it is in the public interest to grant a reservation on Running Wolf Creek to project JBS-2 only and not grant a reservation for project JB-261.

38. There are adverse effects to other resources that may result from development of some of these projects. (Bd. Exh. 28-

C, Table 9, and pp. 17; Bd. Exh. 40, pp. 212; Transcript Day 4, pp. 106-112, 115-119, 126 and 127.)

39. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

40. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

41. The Judith Basin Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 28-A, p. 25) as required by ARM 36.16.107B(7).)

42. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

43. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).) Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6).

44. As conditioned, and subject to existing water rights with an earlier priority date, the Judith Basin Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

III. CONCLUSIONS OF LAW

1. Judith Basin Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Judith Basin Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Judith Basin Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-

state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. Judith Basin Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Judith Basin Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Judith Basin Conservation District is granted for the following projects: JB-21, JB-61, JB-281, and JBS-3. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Judith Basin Conservation District for those particular projects and by reference are made a part of this Order.The total amount of water reserved for this applicant is 731 acre-feet at a flow rate not to exceed 6.04 cfs to serve a total of 402 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Judith Basin Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish

Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Judith Basin Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF LEWIS AND CLARK CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Lewis and Clark County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 29-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY LEWIS AND CLARK COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Lewis and Clark County Conservation District has applied to reserve an annual amount of 1,200 acre feet of water to be diverted at a maximum rate of 8.4 cfs to provide irrigation for 6 projects totaling 537 acres. (Bd. Exh. 29-A, pp. 6 and 14.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Lewis and Clark County Conservation District.

3. The Lewis and Clark County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 29-A, p. 7.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). t(Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY LEWIS AND CLARK COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Lewis and Clark County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 29-A, pp. 8 and 9.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY LEWIS AND CLARK COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Lewis and Clark County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 29-A, p. 10-14; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY LEWIS AND CLARK COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The benefit-cost factor [ARM 36.16.107B(4)(a)] requires a weighing of the benefits and costs of each reservation application. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower

Water quality
Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Lewis and Clark County Conservation District were found to be $24.15 per acre-foot for those projects in the district above Holter Dam, and $20.20 for those projects in the district below Holter Dam. These figures take into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
LC-11	16.97	24.15	-7.19
LC-131	22.95	20.20	2.75
LC-210	29.42	20.20	9.22
LC-251	0.21	20.20	-19.99
LCI-10	12.08	24.15	-12.07
LCI-20	35.40	29.20	15.20

30. Based on this analysis, the expected net benefits for projects LC-131, LC-210, and LCI-20 exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero with financial feasibility that is likely and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 28-A, pp. 26-27.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 29-A, pp. 12, 20, 66 and 67; Bd. Exh. 29-C, pp. 4-7.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 29-C, Table 9; Bd. Exh. 40, pp. 207; DFWP Exh. 4, pp. 2 and 3; Transcript Day 4, pp. 106-112.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. Lewis and Clark County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 29-A, p. 23-24) as required by ARM 36.16.107B(7).)

39. Lewis and Clark County Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Lewis and Clark County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Lewis and Clark County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Lewis and Clark County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Lewis and Clark County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Lewis and Clark County Conservation District are suitable and accurate. Lewis and Clark County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Lewis and Clark County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a

reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Lewis and Clark County Conservation District is granted for the following projects: LC-131, LC-210, and LCI-20. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Lewis and Clark County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 654 acre-feet at a flow rate not to exceed 4.8 cfs to serve a total of 295 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Lewis and Clark County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Lewis and Clark County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF LIBERTY COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Liberty County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 26-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY LIBERTY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Liberty County Conservation District has applied to reserve an annual amount of 7,147 acre feet of water to be diverted at a maximum rate of 51.8 cfs to provide irrigation for 6 projects totaling 3,444 acres. (Bd. Exh. 26-A, pp. 4 and 13.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Liberty County Conservation District.

3. The Liberty County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 26-A, p. 6.) Irrigation is a beneficial use as defined by ARM 36.16.102(3).

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY LIBERTY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Liberty County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 26-A, pp. 7 and 8.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY LIBERTY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Liberty County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 26-A, p. 9-12; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY LIBERTY COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The benefit-cost factor [ARM 36.16.107B(4)(a)] requires a weighing of the benefits and costs of each reservation application. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower

Water quality
Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Liberty County Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
LI-91	-1.00	7.54	-8.54
LI-161	33.96	7.54	26.42
LI-162	28.60	7.54	21.07
LI-261	4.82	7.54	-2.72
LI-262	6.77	7.54	-0.77
LI-263	14.00	7.54	6.46

30. Based on this analysis, the expected net benefits for projects LI-161, LI-162, and LI-263 exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife

and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 26-A, p. 21.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 26-A, pp. 10, 11, 19 and 65; Bd. Exh. 26-C, pp. 3-4.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Exh. 26-C, Table 8; Bd. Exh. 40, pp. 208 and 209; DFWP Exh. 4, pp. 17-21; Tr. Day 4, pp. 130-132.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Liberty County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 26-A, p. 22-24) as required by ARM 36.16.107B(7).)

39. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Liberty County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Liberty County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Liberty County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Liberty County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Liberty County Conservation District are suitable and accurate. Liberty County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Liberty County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Liberty County Conservation District is granted for the following projects: LI-161, LI-162, and LI-263. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Liberty County Conservation District for those particular projects and by reference are made a part of this Order.The total amount of water reserved for this applicant is 2002 acre-feet at a flow rate not to exceed 13.5 cfs to serve a total of 882 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Liberty County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Liberty County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF LOWER MUSSELSHELL CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Lower Musselshell Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 30-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY LOWER MUSSELSHELL CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Lower Musselshell Conservation District has applied to reserve an annual amount of 8,150 acre feet of water to be diverted at a maximum rate of 90 cfs to provide supplemental water for existing irrigated lands in the Musselshell basin. (Bd. Exh. 30-A, pp. 5; Bd. Exh. 41 pp. 6.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Lower Musselshell Conservation District.

3. The Lower Musselshell Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 30-A, p. 6.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY LOWER MUSSELSHELL CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Lower Musselshell Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 30-A, pp. 7 and 8.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY LOWER MUSSELSHELL CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Lower Musselshell Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 30-A, p. 9-14; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY LOWER MUSSELSHELL CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality Economic opportunity costs to

parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must

also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Lower Musselshell Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
LM-20	21.65	7.54	14.11

30. Based on this analysis, the expected net benefits for the project exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the project identified in Findings of Fact 29 as having a net value greater than zero and granting all instream flow reservations priority

over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 30-A, p. 22.)

34. At the time the district developed its application, it was thought that the Jeffrey Mine was connected to larger mines which contain the bulk of the water requested. More recent data shows the Jeffrey Mine is not connected to the other mines (Bd. Exh. 40, pp. 175.)

35. There is water available in other nearby mines, but the quality of water in them is probably not suitable for irrigation. (Bd. Exh. 40, pp. 188.)

36. Using water from mines other than the Jeffrey would involve pumping costs that would make the project more costly and less feasible. (Bd. Exh. 30-C, p. 8.)

37. As applied for the project is not in the public interest.

38. The project would be in the public interest if it was granted for a volume of 600 acre-feet for year, the estimated usable storage capacity of the Jeffrey Mine and the nearby Republic #4 mine. (Bd. Exh. 40, p. 175.)

39. There are adverse effects to other resources that may result from development of some of these projects.(Exh. 30-C, Table 8.)

40. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

41. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

42. The Lower Musselshell Conservation District has identified a management plan for the developing and financing its

water reservation projects (Bd. Exh. 30-A, p. 23-24) as required by ARM 36.16.107B(7).

43. Lower Musselshell Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

44. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

45. This project contemplates the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

46. As conditioned, and subject to existing water rights with an earlier priority date, the Lower Musselshell Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

47. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Lower Musselshell Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Lower Musselshell Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Lower Musselshell Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Lower Musselshell Conservation District are suitable and accurate.Lower Musselshell Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water

reservation requested by Lower Musselshell Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Lower Musselshell Conservation District is granted for the following project: LM-20. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Lower Musselshell Conservation District for those particular projects and by reference are made a part of this Order except that in no event shall the amount of water diverted from the mine exceed 600 acre feet per year.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Lower Musselshell Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of

itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Lower Musselshell Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

Application of Meagher County Conservation District
Water Reservation No. 71997-41J

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF MEAGHER COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Meagher County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 31-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY MEAGHER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Meagher County Conservation District has applied to reserve an annual amount of 1,812 acre feet of water to be diverted at a maximum rate of 15.7 cfs to provide irrigation for 3 projects totaling 1,125 acres. (Bd. Exh. 31-A, pg. 5 and 12.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Meagher County Conservation District.

3. The Meagher County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 31-A, p. 6.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY MEAGHER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Meagher County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 31-A, pg. 7 and 8.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY MEAGHER COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Meagher County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 31-A, p. 9-12; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY MEAGHER COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality Economic opportunity costs to

parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must

also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exh. 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Meagher County Conservation District were found to be $20.20 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
MEI-11	5.34	20.20	-14.86
MEI-12	14.72	20.20	-5.48
MEI-20	5.32	20.20	-14.88

30. Based on this analysis, the expected net benefits for none of the projects exceed costs.

31. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

III. CONCLUSIONS OF LAW

1. Meagher County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Meagher County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Meagher County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Meagher County Conservation District are suitable and accurate. Meagher County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Meagher County Conservation District has not established that its water reservation is in the public interest.

6. The Board may grant, deny, modify or condition any reservation applied for. (Mont. Code Ann. § 85-2-331(4).) In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316.)

IV. ORDER

1. The reservation application of Meagher County Conservation District is denied.

Application of Pondera County Conservation District
Water Reservation No. 72585-41M

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF PONDERA COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Pondera County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 32-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY PONDERA COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Pondera County Conservation District has applied to reserve an annual amount of 2,092 acre feet of water to be diverted at a maximum rate of 16 cfs to provide irrigation for 8 projects totaling 1,058 acres. (Bd. Exh. 32-A, pp. 6 and 14.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Pondera County Conservation District.

3. The Pondera County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 32-A, p. 6.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY PONDERA COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Pondera County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 32-A, p. 8 and 9.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY PONDERA COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Pondera County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 32-A, pp. 10-14; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY PONDERA COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bed. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Pondera County Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
PO-91	-0.61	7.54	-8.15
PO-171	49.70	7.54	42.16
PO-211	24.48	7.54	16.94
PO-251	30.61	7.54	23.08
PO-271	39.79	7.54	32.25
PO-411	25.32	7.54	17.78
PO-421	17.46	7.54	9.92
POI-10	54.89	7.54	47.35

30. Based on this analysis, the expected net benefits for projects PO-171, PO-211, PO-251, PO-271, PO-411, PO-421, and POI-10 exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 32-A, p. 22.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 32-A, p. 12, 20, 71 and 72; Bd. Exh. 32-C, pp. 3-6.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 32-C, Table 9, p. 10; Bd. Exh. 40, pp. 208 and 209; DFWP Exh. 4, pp. 17-21.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Pondera County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 32-A, p. 23-24) as required by ARM 36.16.107B(7).

39. Pondera County Conservation District is capable of exercising reasonable diligence towards feasibly financing its

project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Pondera County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Pondera County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Pondera County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Pondera County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. Methodologies used by applicant are accurate and suitable. (ARM 36.16.107B(3)(a).) Pondera County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Pondera County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Pondera County Conservation District is granted for the following projects: PO-171, PO-211, PO-251, PO-271, PO-411, PO-421, and POI-10. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Pondera County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 1975 acre-feet at a flow rate not to exceed 15.1 cfs to serve a total of 1006 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Pondera County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Pondera County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

Application of Teton County Conservation District
Water Reservation No. 72574-41O

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF TETON COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Teton County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 33-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY TETON COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Teton County Conservation District has applied to reserve an annual amount of 15,498 acre feet of water to be diverted at a maximum rate of 100 cfs to provide irrigation for 23 projects totaling 8,435 acres. (Bd. Exh. 33-A, pp. 7 and 18.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Teton County Conservation District.

3. The Teton County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 33-A, p. 9.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

4. The Teton County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 33-A, pp. 10 and 11.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be

appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY TETON COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Teton County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 32-A, pp. 10-14; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY TETON COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the

value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Teton County Conservation District were found to be $20.20 in those portions of the district in the Sun River basin and $7.54 per acre-foot of water in the Teton River basin. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
TE-81	1.99	7.54	-5.55
TE-101	75.52	7.54	67.98
TE-181	37.49	20.20	17.29
TE-183	18.59	20.20	-1.61
TE-281	24.38	7.54	16.85
TE-282	28.23	7.54	20.69
TE-321	90.17	7.54	82.63
TE-361	83.52	7.54	75.98
TE-401	20.08	7.54	12.54
TE-411	47.19	7.54	39.65
TE-571	20.35	20.20	0.15
TE-581	66.44	7.54	58.91
TE-591	85.84	7.54	64.19

TEI-10	36.92	7.54	29.38
TEI-20	33.73	7.54	26.20
TEI-30	36.24	7.54	28.71
TEI-40	63.48	7.54	55.94
TEI-50	45.16	7.54	37.62
TEI-60	49.84	7.54	42.30
TEI-70	22.40	7.54	14.86
TEI-80	50.87	20.20	30.67
TEI-90	39.59	20.20	19.39
TEI-100	51.12	20.20	30.92

30. Based on this analysis, the expected net benefits for projects TE-101, TE-181, TE-281, TE-282, TE-321, TE-361, TE-401, TE-411, TE-571, TE-581, TE-591, TEI-10, TEI-20, TEI-30, TEI-40, TEI-50, TEI-60, TEI-70, TEI-80, TEI-90 and TEI-100 are likely to exceed costs. However there is only limited water available in the Teton River. (Bd. Exh. 40, pp. 166-169; Reichelt Exh. 1; Reichelt Testimony Tr. Day 3, pp. 295-310. Projects TE-281, TE-282, TE-361, TE-401, TE-411, TEI-10, TEI-20, TEI-30, TEI-40, TEI-50, TEI-60 and TEI-70 are not financially feasible when water is only available 6 years out of 10. Therefore benefits do not exceed costs for those projects.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero with financial feasibility that is likely and not granting the projects identified in Findings of Fact 29 as having a net value less than zero, or those that are not feasible, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 33-A, p. 22.)

34. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 33-C, Table 9, pp. 17 -19; Bd. Exh. 40, pp. 207, 208, 209 and 227; DFWP Exh. 4, pp. 8-12, and 15.)

35. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation the reservation as modified and conditioned will cause no significant adverse impacts to the public health, welfare, and safety.

36. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

37. The Teton County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 33-A, pp. 28-30) as required by ARM 36.16.107B(7).)

38. Teton County Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

39. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

40. Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6.)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Teton County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Teton County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Teton County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Teton County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for

the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Teton County Conservation District are suitable and accurate. Teton County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Teton County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Teton County Conservation District is granted for the following projects: TE-101, TE-321, TE-571, TEI-80, TEI-90 and TEI-100. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Teton County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 3253 acre-feet at a flow rate not to exceed 22.0 cfs to serve a total of 1505 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Teton County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of

Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Teton County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF TOOLE COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Toole County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 34-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY TOOLE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Toole County Conservation District has applied to reserve an annual amount of 2,790 acre feet of water to be diverted at a maximum rate of 19.6 cfs to provide irrigation for 5 projects totaling 1,372 acres. (Bd. Exh. 34-A, pp. 5 and 14.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Toole County Conservation District.

3. The Toole County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 34-A, p. 7.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY TOOLE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Toole County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 34-A, pp. 8 and 9.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY TOOLE COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Toole County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are suitable (Bd. Exh. 34-A, pp. 10-13; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY TOOLE COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
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Upper Missouri	$19.46	$4.76
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(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Toole County Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
TO-211	-11.98	7.54	-19.52
TO-221	20.66	7.54	13.12
TO-341	34.28	7.54	26.74
TO-342	7.06	7.54	-0.47
TO-421	5.86	7.54	-1.68

30. Based on this analysis, the expected net benefits for projects TO-221 and TO-341 exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife

and Parks in all reaches requested, granting the projects identified in Findings of Fact 29 as having a net value greater than zero, not granting the projects identified in Findings of Fact 29 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 34-A, p. 23.)

34. For the projects which had benefits exceeding costs and for which were financially feasible water was found to be physically available. (Bd. Exh. 34-A, pp. 11, 12, 21, 66 and 67; Bd. Exh. 34-C, pp. 3-5.)

35. There are adverse effects to other resources that may result from development of some of these projects.(Bd. Exh. 34-C, Table 9; Bd. Exh. 40, pp. 208 and 209; DFWP Exh. 4, pp. 17-21.)

36. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Toole County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 32-A, p. 23-24) as required by ARM 36.16.107B(7).

39. Toole County Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

41. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

42. As conditioned, and subject to existing water rights with an earlier priority date, the Toole County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

43. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Toole County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Toole County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Toole County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Toole County Conservation District are suitable and accurate. Toole County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Toole County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Toole County Conservation District is granted for the following projects: TO-221 and TO-341. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Toole County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 641 acre-feet at a flow rate not to exceed 4.7 cfs to serve a total of 309 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Toole County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Toole County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF VALLEY COUNTY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Valley County Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Section 85-2-316. (Bd. Exh. 35-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY VALLEY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Valley County Conservation District has applied to reserve an annual amount of 92,000 acre feet of water to be diverted at a maximum rate of 499 cfs to provide irrigation for 1 projects totaling 25,020 acres. (Bd. Exh. 35-A, pp. 5.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Valley County Conservation District.

3. The Valley County Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 35-A, p. 6.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY VALLEY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Valley County Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin. (Bd. Exh. 35-A, pp. 7 and 8.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY VALLEY COUNTY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Valley County Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 35-A, pp. 9-12; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY VALLEY COUNTY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality

Economic opportunity costs to parties other than reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Valley County Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
VAS-1	8.29	7.54	0.76

30. Based on this analysis, the expected net benefits for the project exceed costs.

31. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the project as identified in Finding of Fact 29 as having a net value greater than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

32. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

33. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 35-A, p. 21.)

34. For the projects which had benefits exceeding costs water was found to be physically available. (Bd. Exh. 35-A, pp. 11, 12, 21, 66 and 67; Bd. Exh. 35-C, pp. 3-5.)

35. There are adverse effects to other resources that may result from development of some of these projects. (Bd. Exh. 35-C, Table 8.)

36. If conditioned that the projects must comply with all health and water quality laws, and subordinated to all instream flow reservation the reservation will cause no significant adverse impacts to the public health, welfare, and safety.

37. The benefits of granting a reservation for this project exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

38. The Valley County Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 35-A, p. 22-23) as required by ARM 36.16.107B(7).

39. Valley County Conservation District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

40. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).)

41. As conditioned, and subject to existing water rights with an earlier priority date, the Valley County Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

42. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. Valley County Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Valley County Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Valley County Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Valley County Conservation District are suitable and accurate. Valley County Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Valley County Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Valley County Conservation District is granted for the following project: VAS-1. The amount of diversion, volume of diversion, places of diversion and

places of use are as set forth in the reservation application of Valley County Conservation District for those particular projects and by reference are made a part of this Order. The total amount of water reserved for this applicant is 92,000 acre-feet at a flow rate not to exceed 499 cfs to serve a total of 25,020 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Valley County Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Valley County Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

Application of United States Department of Interior
Bureau of Reclamation
Water Reservation No. 72579-41T

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE U.S. BUREAU OF RECLAMATION TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).

1. The United States Department of the Interior, Bureau of Reclamation, hereinafter Bureau of Reclamation, is a federal agency (Bd. Exh. 36-A.2, p. 2) and a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. A, p. 2).

2. The Bureau of Reclamation has applied to reserve an annual amount of 89,000 acre-feet of water to be diverted at a maximum rate of 280 cfs to provide irrigation for lands in the Milk River drainage totaling 53,600 acres; and deliver water to the Lake Bowdoin National Wildlife Refuge and the town of Chinook. (BOR Exh. 13, Mercer Dir., p. 1; Bd. Exh. 36-C, p. 1).

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

3. The Bureau of Reclamation seeks to reserve water for future irrigation, fish and wildlife purposes and municipal purposes. (Bd. Exh. 36-A, p. 5). Irrigation, fish and wildlife purposes and municipal purposes are beneficial uses as defined by ARM 36.16.102(3).

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Bureau of Reclamation has established a need for the reservation pursuant to ARM 36.16.107B(2) based on the following:

a) water use in the Missouri River basin and existing water rights together with new permits could leave little water available for future use by the Bureau of Reclamation for these purposes. A priority date of July 11, 1985 allows water use by the applicant. If users in the Milk River basin are to be assured an adequate supply of water for irrigation, wildlife and municipal uses as early priority date for the water must be preserved. (Bd. Exh. 36-A.1, p. 6, 7). Furthermore, the potential exists for conflict with downstream states over water use in the Missouri River basin. (Bd. Exh. 36-A.1, p. 6, 7).

b) The Bureau of Reclamation desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248).

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3)).

5. The Bureau of Reclamation has applied for a water reservation at a flow rate of 280 cfs to serve 53,600 acres of land with irrigation water. Of these 53,6000 acres approximately 33,000 are for lands served by junior water rights on the Milk River. (Bd. Exh. 36-A.1, p.8). Approximately 8,000 of the junior water rights acres are classified as class 6 lands due to drainage, topography or soils. (Bd. Exh. 36-A.1, p. 8).

6. The application is supported by two lengthy documents. The first of these is Attachment B to the Application (Bd. Exh. 36-A.2) called "Special Report Summarizing the Milk River Water Supply" (July, 1990), hereinafter referred to as "Special Report". The second, (Bd. Exh. 36-A.2) is entitled "Milk River Water Supply Study Plan Formulation Working Document", hereinafter referred to as PFWD.

7. Both the Special Report and the PFWD set forth a three-part plan for improving water supply in the Milk River. Phase One of the plan consists of among other efforts organizing a joint board of control for Milk River irrigators and restoring the St. Mary Canal. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-3; Mercer Cross, Tr. Day 5, p. 175).

8. Phase Two of the Plan is to improve efficiencies of water use and make other water use improvements (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-3).

9. Phase Three of the project is formulated to provide adequate water supply for landowners with junior water rights, Indian reservations, Bowdoin National Wildlife Reservation, and the Town of Chinook with water from the Missouri River. (Special Report at 5-6).

10. According to the Special Report the preferred alternative for Phase Three is the construction of a pump station located upstream of Boggs Island on the Missouri River with a canal of approximately 46 miles in length to move the Missouri to the Milk River. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-6). This is also the preferred alternative of the PFWD. (PFWD, Bd. Exh. 36-A.2, p. 5-6).

11. The preferred alternative sets forth the construction of a 230 cfs pump plant and 230 cfs capacity canal not the 280 cfs diversion set forth in the application. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-6; Mercer Cross, Tr. Day 5, p. 112).

12. The Phase Three plan with the 230 cfs diversion was formulated to provide an adequate water supply to the landowners with junior water rights, to the Gros Ventre-Assiniboine Tribes on the Fort Belknap Reservation for irrigation, to the Bureau of Land Management for stockwater ponds, to the Bowdoin National Wildlife Refuge for wildlife and recreation purposes, and to the Town of Chinook for municipal purposes. Water for irrigation purposes would also be provided to landowners along the canal including the Chippewa Cree Tribe on the Rocky Boy's Reservation. (Special Report, p. 4-3).

13. During dry years 68,000 acre-feet of water would be diverted for these uses. Of this, 47,100 would be for irrigation and 20,900 for non-irrigation purposes. (Special Report, p. 4-28).

14. The diversion rate and amounts set forth in the Special Report (Bd. Exh. 36-A.2, Attachment B) and not the diversion rate and amounts set forth in the application are what is needed by the applicant.

15. Taking into account the above reduction which conforms the application to its supporting documents, the Bureau of Reclamation has established methodologies used in determining the amounts requested, and that the water-use efficiencies associated with the diversionary uses are suitable as required by ARM 36.16 107B(3).

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE BUREAU OF RECLAMATION IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

16. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

> Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4).

17. In general, the benefits and costs of this project are as follows:

Direct Benefits:	Irrigation Crop Revenues, fish and wildlife benefits, municipal benefits
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality Economic opportunity costs to parties other than reservant

18. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation, fish and wildlife benefits and municipal benefits should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6).

19. The direct benefits of water for irrigation on the proposed application was determined by DNRC, based on a detailed analysis of the project. (Bd. Exh. 41, p. 35). For the irrigation part of the application, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for the application. (Bd. Exh. 41, p. 35). The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis is set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

20. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

21. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

22. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have

an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

23. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

24. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tubbs Cross, Tr. Day 3, p. 253.)

25. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.)

26. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

27. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

28. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

29. Estimates of water consumed by the application derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

30. The model considers crop water requirements and irrigation efficiencies for the application. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

31. The direct benefits do not adequately take into account indirect benefits of the project including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exh. 1.)

32. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

33. Recreation values per acre-foot of water in the Missouri River drainage were calculated as follows using the Contingent Valuation Method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bed. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

34. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

35. As calculated, recreational value is determined on the basis of impacts that would reduce instream flow basinwide. (DFWP Exh. 31, p. 36.) Based on the priority of the DFWP and DHES reservation in this proceeding the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

36. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

37. After a review of all factors, hydropower values for each acre-foot of water consumed by the Bureau of Reclamation are $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated downstream. (See Bd. Exh. 40, Table 6-43.)

38. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.). The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water (Findings of Fact 38).

39. The Bureau of Reclamation has estimated the per year non-irrigation benefits of the application at 231,000/year allocated as follows:

Fish and Wildlife (Lake Bowdoin) Use	$122,000
BLM Stockponds Use	72,000
Municipal Use	37,000

These values are reasonable. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 4-40).

40. The per acre value of non-irrigation water to be used by the applicant is $11.05 per acre-foot or $231,000 divided by 20,900 acre-feet.

41. Taking into account all quantifiable values and costs, a comparison of application benefits to hydropower costs per acre-foot of water for all uses of water proposed by the Bureau of Reclamation are as follows:

Water Used for Irrigation Purposes

Value for Irrigation	$13.17 per acre-foot
Value for Lost Hydropower	-7.54 per acre-foot
Net Value of Proposal	$ 5.63

Water Used for Non-Irrigation Purposes

Value for Fish, Wildlife and Municipal	$11.05 per acre-foot
Value for Lost Hydropower	-7.54 per acre-foot
Net Value of Proposal	$ 3.51

42. Based on this analysis, the net benefits of water used for irrigation or non-irrigation purposes exceed costs for this application.

43. Granting instream flow reservations in all reaches requested, granting the application and granting instream flow reservations with priority over the application results in the greatest net benefits to society.

44. No reasonable alternatives to these projects were identified that had greater net benefits.

45. Failure to reserve water for this application will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 23-A, p. 26 and 27).

46. Water was found to be physically available for this application. (Bd. Exh. 23-A, p. 23-33; Bd. Exh. 23-C, p. 9-12 and 26-28)

47. Although there are adverse effects to other resources that may result from development of the application (Bd. Exh. 23-C, Table 8, p. 23-25; Bd. Exh. 40, p. 191, 197, 204 and 225), these costs were not found to offset benefits of the application.

48. One of the adverse effects that would result from development of the application is the introduction of arsenic from the Missouri river into the Milk River drainage.

49. The costs or risks of introducing arsenic into the Milk River are offset by the many positive social impacts of development of the application. Supplementing Milk River supplies would allow the maintenance of irrigation in the Milk River basin. This irrigation provides an economic livelihood for residents of the basin. Development would also be conductive to resolving reserved Indian tribes to the benefit of the state, the federal government and the Indian Tribes. (BOR Exh. 13, Mercer Dir., p. 2-3).

50. If conditioned that the application must comply with all health and water quality laws, these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

51. The benefits of granting a reservation for these projects exceeds those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8)).

52. The Bureau of Reclamation has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 23-A, p. 64-73) as required by ARM 36.16.107B(7).

53. As conditioned, and subject to existing water rights with an earlier priority date, the Bureau of Reclamation's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

54. The Bureau of Reclamation is hereby granted a water reservation for 68,000 acre-feet per year, to be diverted at a maximum rate of 230 cfs for irrigation, wildlife and recreation, stockwater, and municipal uses.

55. Before construction, this project must be subject to environmental review. (Mercer Red., Tr. Day 5, p. 175).

56. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. The Bureau of reclamation is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).

2. The purpose of the Bureau of Reclamation's application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).

3. The need for the Bureau of Reclamation has been established. Specifically, the Bureau has established that thee is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The methodologies and assumptions used by the BOR are suitable and accurate.As modified by the Board, the Bureau of Reclamation has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by the Bureau of Reclamation is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the Bureau of Reclamation is granted as modified.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Bureau of Reclamation shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish, Wildlife and Parks, United States Department of the Interior (Bureau of Land Management), as well as the consumptive use reservations granted to all conservation districts.

4. Any and all liability arising from the reservations or the use of the reservations is the sole responsibility of the applicants. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of the Bureau of Reclamation reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.

EXHIBIT A

Conditions Applicable to All Reservations Granted

1. Reservations granted in the Order are subject to all prior existing water rights in the source of supply, including storage rights, and any final determination of existing water rights as provided by Montana law. Reservations are also subject to all prior Federal and Indian reserved rights. The reservants may use reserved water only when such use will not adversely affect prior water rights.

2. The reservations are subject to all Federal, State, and Local laws.

3. In accordance with rules adopted by the Board, but not less than every two years after the date of the Order granting the reservation, the reservant shall submit a report to the Board with such information as the Board may reasonably require.

4. Pursuant to Mont. Code Ann. § 85-2-316(10)(1991), the Board shall review water reservations granted in this order at least every 10 years to insure the objectives of the reservation are being met. Where the Board determines the objectives are not being met, it may, after notice and hearing, extend the term, modify, or revoke the reservation.

5. Any proposed changes of the reservation in point of diversion, place of use, purpose of use, or place of storage, from that originally granted by the Board, shall be made in accordance with the requirements of Mont. Code Ann. § 85-2-402 (1991). Further, the Board shall not approve the change unless provisions of Mont. Code Ann. § 85-2-316 (1991) are met.

6. The reservations are subject to all water uses which do not require a permit under Mont. Code Ann. § 85-2-306 (1991) that were beneficially use prior to the date of the Order granting the reservations.

7. The reservations may be subordinated to permits issued prior to the date of the Order granting the reservations pursuant to Mont. Code Ann. § 85-2-316(9)(d)(1991).

8. Conditions of this Order may be added, modified or deleted by the Board after notice and hearing.

9. All decisions made by the Board regarding water reservations granted in this order are appealable under the provisions of the Montana Administrative Procedure Act.

EXHIBIT B

Conditions Applicable to All Consumptive Use Reservations Granted

1. Water diverted for consumptive use projects shall be measured daily during project operation using measuring devices approved by DNRC. The reservant shall submit records of time period and amount of water diverted to the Board or DNRC upon request.

2. Further environmental review is required for irrigation projects JV-202, CHS-5, and VAS-1 prior to development. The Board may modify or revoke the reservation based upon this review.

3. For projects where the source is groundwater, a site-specific study to define the local geology, extent of the aquifer, aquifer hydraulic characteristics, recharge-discharge relationships, surface water interconnection and water quality must be submitted to the Board before project development. The investigation shall be proportional to the volume of groundwater required, number of wells, and the potential for impact of the development on senior appropriators.

4. In managing their water reservation, the Broadwater, Gallatin, and Jefferson Valley Conservation Districts shall use the Administrative Procedures contained in the applications of the conservation districts below Canyon Ferry Dam.

5. The Administrative Procedures for all conservation districts are amended to include the procedure for Revocation of Authorization as set out in Attachment I herein.

EXHIBIT C

Conditions Applicable to All Instream Flow Reservations Granted

1. If the Board determines that new techniques have been developed that more suitably and accurately determine instream flow needs for the purposes of a reservation, it may require a reservant to submit revised estimate of instream flow needs based on these new techniques. After notice and hearing, the Board may modify instream flow reservations granted in this Order based on revised estimates.

2. Instream flow reservations are subject to modification if any feasible new storage facilities are developed that may otherwise be precluded by a reservation. The Board may only approve the modification, after notice and hearing, if the resource values protected by the reservation will be maintained or enhanced by the storage facility.

ATTACHMENT I

REVOCATION OF AUTHORIZATION

The District may revoke an authorization as provided under these rules. Additionally, if the work of an appropriation is not commenced, prosecuted, or completed within the time stated in the authorization or an extension thereof or if the water is not being applied to the beneficial use contemplated in the authorization or if the authorization or Board Order creating the reservation is otherwise not being followed, the District may revoke the authorization. Specific cases include but are not limited to the abandonment of the reserved water use or an irrigation system by the water user, violation of an authorization provision or the waste or misuse of allocated water. The Department shall be notified of any authorization revocations.

Violation of Water Use Authorization: The applicant is responsible for using water in accordance with an authorization issued by the District. Violations of the authorization are cause for the District to revoke the water use authorization. The water user shall be given written notice of the violation and shall be given a reasonable period in which to correct the violation. If the authorization is revoked the water will be made available for subsequent allocations.

Abandonment of Irrigation System: Abandonment of an irrigation system by a water user will cause that authorization to be revoked. The District will contact the water user before revoking an authorization to determine the cause and intent of abandonment. The District may defer revocation upon written request by the water user if circumstances indicate that the water user had no intentions of abandonment.

The District will consider a reserved water use or an irrigation system to be abandoned if the reserved water use or respective system has not been used for a period of 10 (Ten) consecutive years, provided water for diversion was available during that time.

Waste of Reserved Water: The water users may use water by any method acceptable in the area. Such use shall be in the most efficient manner possible for the particular method. Any misuse or waste of water shall result in revocation of the authorization by the District.

Authorization Revocation Meetings: Before an authorization is revoked, the District shall invite the water user to the next regularly scheduled District meeting or mutually agreed upon time. At such meeting the water user may present information to the District to show that there is no violation, abandonment, waste or misuse of water, or other grounds for revocation of the authorization. Upon determining that grounds exist for revocation, the District may revoke the authorization, or the District may, if circumstances warrant, modify the authorization to prevent a further violation of the authorization. If information presented by the water user substantiates his claim that there are no grounds for revocation, the District may not revoke the authorization.

MEMORANDUM

In the course of preliminary proceedings, the hearing itself and post-hearing proposed findings of fact, conclusions of law, orders, briefs, and exceptions submitted by the parties, several important legal issues were raised. Some of these matters were addressed in preliminary orders, rulings made at the time of the hearing, and by the Board adopting its Final Order disposing of issues raised by the exceptions. Certain issues remain that are best addressed by a memorandum in support of the Final Order. This memorandum is issued as the basis for various rulings made in the course of the proceeding.

1. Due Process

Throughout this proceeding various objectors have contended that the contested case hearing violated due process.

a. Procedural Due Process

These parties first contend that the water reservation procedure did not afford objectors procedural due process of law. More specifically, they assert that the water reservation procedure gave them insufficient time in which to exercise their right to be heard. (E.g., Brief in Support of Motion to Dismiss on Due Process Grounds, Upper Big Hole Objectors, pp. 2 and 3.)

Water reservation applications, if granted, establish water rights. The decision-making process on water reservation

applications falls under the provisions of the Montana Administrative Procedure Act (MAPA). Mont. Code Ann. § 2-4-601 et seq. (1991), and procedural due process must be afforded all parties. Essential elements of procedural due process are reasonable notice and opportunity to be heard. Mont. Code Ann. § 2-4-601 (1991). Furthermore, contested case hearing procedures must be appropriate to the nature of the case and participants must be provided opportunity to be heard at a meaningful time and in a meaningful manner. Montana State University v. Ransier, 167 Mont. 149, 154 (1975).

For this contested case, the procedure is set out by statute. Mont. Code Ann. § 85-2-316(3)(1991) (requiring that the notice and hearing procedures for water right permits, Mont. Code Ann. §§ 85-2-307 through 309, be followed except where specifically set forth.) Specific provisions for notice require:

a. that notice be mailed to water right holders in the area potentially affected by the proposed appropriation, and

b. that notice be published in a newspaper of general circulation in the area.

The notice must include facts pertinent to the application and state that parties have an opportunity to object and request a hearing. Mont. Code Ann. § 85-2-307(1)(a)(b)(1991).

The Board approved the Notice in this matter and the DNRC sent the Notice, dated July 19, 1991, by first class mail to 11,000 water right holders in the Missouri River basin above Fort Peck Dam. The Notice was also published in eleven newspapers of

general circulation in the basin on July 31, 1991. This Notice was very complete and reasonably calculated under the circumstances to appraise interested parties of the pending action and afford them an opportunity to present their objections. Byrd v. Columbia Falls Lions Club, 183 Mont. 330, 332 (1979).

The Notice provided 30 days for parties to file an objection. 514 objections were received. The hearing started February 3, 1992 and closed on February 28, 1992.

The affected objectors argue that the six-month period between the issuance of the Notice and the contested case hearing was so insufficient as to deny them their "day in Court" and violated their procedural due process rights. (Brief in Support, pp. 1-3.) The Montana Supreme Court has set out some factors to be considered in reviewing whether procedural due process has been provided to a party.

> Due process is not a mechanical instrument. It is not a yardstick. It is a process. It is a delicate process of adjustment inescapably involving the exercise of judgment by whom the Constitution entrusted with the unfolding of the process. * * * The precise nature of the interest that has been adversely affected, the manner in which it was done, the reasons for doing it, the available alternatives to the procedure that was followed, the protection implicit in the office of the functionary whose conduct is challenged, the balance of hurt complained of, and good accomplished - these are some of the considerations that must enter into the judgment.

Montana Power Company v. Public Service Commission, 206 Mont. 359, 367-368 (1983)(summary agency ruling without

hearing)(quoting, Anti-Fascist Committee v. McGrath, 341 U.S. 123, 163 (1951).

The affected objectors state that if more time were available, they would have produced factual evidence of streamflows, fish population, etc. (Brief in Support, p. 5). The objectors have failed to show specifically what information would be presented if more time were allowed, or the time frame necessary to gather such information. The objectors have failed to identify the precise nature of the interests that would be adversely affected, or how this information is relevant to those interests. (See, supra, p. 23.)

The contested case hearing was carried out in a fair and consistent manner with the full rights of a trial type procedure. MSU v. Ransier, at 155. A pre-hearing conference was held on September 19, 1991 and the schedule for the hearing was established and other pre-hearing procedures set out. (ORDER, Oct. 2, 1991.) Objectors filed a Motion for Extension of Time for pre-filing testimony. In denying that Motion, the Hearing Examiner concluded that the parties had not shown that any prejudice would result from the deadline to file written testimony. The Hearing Examiner also ruled that if any prejudice were shown, that party would be allowed to file additional testimony. Some additional testimony was received and introduced without objection. (E.g., Whitetail Water Users Exh. No 5.) No request to offer any additional testimony after the deadline was denied.

Objectors also claimed that due process was denied because the Final EIS was not available until early January 1992. (Brief in Support, pp. 3-4.) The Draft EIS was issued in July 1991 and the public review and comment required by law was complete in September, 1991. Mont. Code Ann. § 75-1-101, et seq. (1991); ARM 36.2.532; ARM 36.16.113(3). The Hearing Examiner provided the parties with an opportunity to amend their testimony or present additional evidence based on any changes or additional information that was contained in the Final EIS that was not found in the Draft EIS. No request was made.

Additionally, objectors state that other documents were not available to them. (Brief in Support, p. 4.) No discovery requests to obtain other documents were filed.

There were substantial reasons for setting up the procedure followed. Procedures used fit the nature of this case, which involved many applicants with a variety of proposed uses, may objectors who objected to various applications, and a very large geographical area. Pre-filed testimony was required for the purposes of expediting the hearing, for the convenience of the parties, and to reduce the need for discovery. This procedure allowed parties to fully participate while keeping the costs of participating down and allowing all facts to be considered within a reasonable amount of time. All objectors were specifically given an opportunity to show how pre-filing testimony by the filing deadline substantially prejudiced their interests. No

such showing was made. Moreover, pre-filed testimony was filed on time and parties fully participated in the hearing.

The procedure for notice and hearing and the deadline for final administrative action are established by statute. The 1985 legislature directed the Board to initiate a water reservation proceeding in the upper Missouri River basin above Ft. Peck Dam. Mont. Code Ann. § 85-2-331(1991). Applications for reservations had to be filed by July 1, 1989, an EIS prepared, and a final Board decision made by July 1, 1992. The alternative to the procedure established by the Board, as promoted by some objectors, would result in the Board violating its statutory mandate and possibly jeopardizing the interests of the water reservation applicants.

When the need to meet the statutory deadlines and the fair and consistent manner in which the hearings process was conducted is balanced against the nature of the interests claimed to be adversely affected, the lack of prejudice shown, and the full participation of the parties, violation of procedural due process cannot be found. The nature of the objectors interests affected does not outweigh the good accomplished by adhering to the established hearing schedule.

The parties had reasonable notice and opportunity to be heard in a meaningful time and in a meaningful manner. The Board concludes that the hearing process did not violate any party's right to procedural due process.

b. Adequacy of EIS

Questions as to the adequacy of the Environmental Impact Statement (EIS) have been raised because the EIS does not discuss a storage alternative. (Brief of Various Objectors (Hanson and Bloomquist, pp. 3-4.) The adequacy of the EIS is associated with the Board's decision-making procedures. It is appropriate to address this issue.

Under MEPA, the DNRC was required to analyze reasonable alternatives to the proposed action. Mont. Code Ann. § 75-1-201(1)(iii)(C)(1991). Because of the large number of applications and the diversity of beneficial uses applied for the EIS analyzes a range of alternative Board actions and related environmental impacts. The alternatives analyzed were the consumptive use, instream, municipal, water quality, combination, and no action. Bd. Exh. Nos. 40 and 41. Storage was not discussed as an alternative.

DNRC did look at the issue of storage in preparing the EIS. A description of existing environment includes a discussion on storage, including, any storage projects that are currently being even considered. Bd. Exh. No. 40, pp. 66-67. The EIS also discusses impacts to possible storage in the future. This discussion is necessarily general since no storage projects are projected for the foreseeable future. Bd. Exh. No. 40, p. 181.

MEPA requires that all reasonable alternatives be

considered.[1] What alternatives must be included in an EIS is governed by a rule of reason. Natural Resource Defense Council v. Morton, 458 F.2d 827 (CA DC, 1972). Remote and speculative alternatives need not be considered. Vermont Yankee Nuclear Power Corp. v. Natural Resource Defense Council, 435 U.S. 519 (1978); Mandelker, NEPA Law and Litigation, §9:19. Reasonableness in consideration of alternatives is also bounded by some notion of feasibility. Vt. Yankee v. NRDC, 435 U.S. 519, 551.

In response to comments on the Draft EIS concerning storage, the Final EIS explains that DNRC had numerous studies and evaluations on onstream and offstream storage project in the Missouri River's headwaters done throughout the past fifty years. Bd. Exh. No. 41, p. 71. "For example, because of low flow conditions in the Big Hole drainage, DNRC evaluated 120 potential storage sites during the 1970s. Twenty-two of these were studies in more detail between 1978 and 1982, and none were considered economically or financially feasible." Id. All studies reviewed concerning the issue of storage, including the Water Storage component of the State Water Plan, were included by reference in the EIS. Although the benefits of storage were referred to many times in the comments to the Draft EIS and the contested case hearing, no other foreseeable site-specific storage projects were identified. Objectors raising this issue do not cite to any

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[1]Federal case law is an appropriate guide in interpreting MEPA. Kadillak v. Anaconda Co., 184 Mont. 127 (1979).

evidence on storage as an alternative that is sufficient to make reasonable minds inquire further. Vt. Yankee v. NRDC, at 554.

No reservation applicants proposed to supply water to maintain instream flows through storage. Therefore, the EIS would have to speculate on storage sites and the costs of developing them to maintain instream flows. Bd. Exh. No. 41, p. 53. The effects of storage as a possible alternative on each individual stream reach cannot be reasonably ascertained. Montana Wilderness Assoc. v. DNRC, 200 Mont. 11, 24 (1982). "A site-specific analysis would be necessary to determine whether it would be feasible to build storage projects to satisfy instream flows." Bd. Exh. No. 41, p. 71. Undertaking this monumental effort would have been unreasonable given the of information showing that the possibility of implementation is remote and speculative. MWA v. DNRC, at 24. Storage was not a reasonable alternative that needed to be considered in the EIS.

The EIS contains a sufficiently detailed discussion on irreversible and irretrievable commitment of water resources. (See, Brief of Various Objectors (Hanson and Bloomquist), pp. 4-5.) Specifically, the EIS analyzes the impacts of future water development, including storage, if instream flows were granted. It also discusses the current constraint on development if existing water right claims are adjudicated as filed. The EIS is comprehensive and well-documented. It provides the Board with an environmental disclosure sufficiently detailed to aid in the substantive decision whether to grant the water reservation

requests. MWA v. DNRC, at 24.

The Board is aware of the impact of its decision on future development of water in the basin, including storage. The Board's decision does not preclude development of storage. The Board left open the option of storage if it is a viable consideration. The record establishes that there is a potential for storage at certain places in the basin and at certain times of the year. Simply because storage has potential, does not, as discussed, require that the EIS deal with it in depth. For the purposes of the reservation process, without site specific storage proposals, the EIS prepared by the DNRC adequately addressed the issue.

c. Substantive Due Process

Certain objectors also assert that the water reservations statute violates their substantive due process rights by being duplicative, unworkable and creating unfair priority rules. (See, Brief in Support of Motion to Dismiss on Due Process Grounds, Upper Big Hole Objectors, pp. 5-9.) The issues raised concern only the applications of the Department of Fish, Wildlife and Parks (DFWP), Bureau of Land Management (BLM), and Department of Health and Environmental Sciences (DHES).

Constitutional guarantees protect a person's property from unfair government interference. Mont. Const., Art. I, § 17. Due process demands "that the law shall not be unreasonable, arbitrary or capricious and that the means selected shall have a

real and substantial relation to the objects sought to be obtained." Montana Milk Control Board v. Rehberg, 141 Mont. 149, 155 (1962). The legislation must be fair and reasonable in content as well as application.

Some objectors argue that the water reservation proceedings are duplicative of other required water right processes, specifically the adjudication currently being conducted by the Water Court. They assert that the cases before the Water Court and the present case before the Board are identical so the reservations statute creates duplicative and unfair burdens on existing water right holders and is, therefore, arbitrary and capricious. (Brief in Support, at 5-7.)

Prior to 1973, there was no advanced state approval or requirement to file an order to perfect a right to use water. The 1972 Constitution "recognized and confirmed" these existing rights. Mont. Const., Art. IX § 3(1). The Constitution also directed the legislature "to provide for the administration, control, and regulation of water rights" and to provide for a centralized system of records. Mont. Const., Art IX Section 3 (4).

To accomplish this Constitutional directive, the legislature passed the comprehensive Water Use Act of 1973. The Water Use Act provides for the adjudication of all existing water rights (pre July 1, 1973), § 85-2-201 through 243, and set out a permit system to apply for a water right after July 1, 1973, § 85-2-301 through 315. The Water Use Act also created a water reservation

system that allows public entities to reserve water for existing or future beneficial uses or to maintain a minimum flow level or quantity of water. Mont. Codes Ann. § 85-2-316(1)(1991).

Montana follows the Prior Appropriation Doctrine. The basic principles of the doctrine are first in time is first in right and beneficial use. The Water Use Act has not changed the basic premise of the Prior Appropriation Doctrine which has always governed water right allocation and use in Montana. The Water Use Act does provide for administration, control and regulation of allocation and use of water rights. Mont. Codes Ann. § 85-2-101(2)(1991). Requiring appropriators to have pre-1973 rights adjudicated and post-1973 rights to go through administrative review for a permit or reservation does not violate due process. See, McDonald v. State, 220 Mont. 519 (1986).

The Water Use Act does require or allow for existing water rights holders to participate in different forums on water use issues. There are, however, reasonable and substantial reasons to require or allow participation to accomplish the Constitutionally mandated purpose of administration, control and regulation of water rights in Montana. Because the state of Montana owns the water for use of its people, the state has a great interest in these purposes. Requiring the adjudication of existing water rights and separately requiring the approval of new water rights is a reasonable means to accomplish the

administration, control and regulation of Montana's water

resources.

Certain objectors state that the adjudication process and the water reservation process deal with essentially the same issues and are duplicative. However, they are very different. Under the general adjudication proceedings conducted by the Water Court, a pre-1973 water right claimant must establish proof of the nature and extent of his or her appropriation. Mont. Code Ann. § 85-2-224(1991). Participation is mandatory. Mont. Code Ann. § 85-2-226(1991). In the Matter of the Adjudication, ____ Mont. ____, Case No. 91-140 (1992). The priority date, amount, and other particulars of a water right claim can be altered by the Court if such a showing of historic beneficial use is not made. Existing water right holders are antagonists in the adjudication process which settles relative priorities. See, McNinch v. Crawford, 30 Mont. 297, 299 (1904).

By contrast, the Water Use Act establishes an exclusive means to obtain a new water right including water reservations. 79 Ranch, Inc. v. Pitsch, 204 Mont. 426 (1983). New water uses are subject to all existing senior rights. Existing water right holders are entitled to object if they feel their water right may be adversely affected by the new use. Mont. Code Ann. § 85-2-308 (1991). This showing is limited to adverse affect. Id. The reservation process does not determine the validity, nature or extent of senior water rights. The Board has no authority to alter a senior water right or deprive that water right of its priority--this is solely the jurisdiction of the Water Court.

Mont. Code Ann. § 82-2-316(14)(1991); ARM 36-16-107B(7). The Board only has the authority to establish a new water right subject to senior water right holders.

The Water Use Act was designed to allow a showing of adverse affect prior to development instead of relying on court proceedings after development and after harm had been suffered. Allowing water right holders the opportunity to object to new permits and water reservations does not violate due process--on the contrary, it was designed to ensure it.[2]

Mont. Code Ann. § 85-2-316 mandates the Board to proceed with a water reservation process on the Upper Missouri River Basin and make a decision by July 1, 1992. Objectors argue that the statute is unconstitutional because it is unworkable until the adjudication is complete. The Board does not have the power to declare statutes unconstitutional. This Board is obligated to carry out the directives of the law.

The adjudication process is continuing and is not anticipated to be completed for at least 15 years. Bd. Exh. No. 41, p. 45. To deny any new appropriative right to water until the adjudication is complete would be unreasonable, unnecessary, and contrary to the policies of Montana for maximum utilization

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[2]The case cited by objectors, St. Johns Irrig. and Ditch Co. v. Arizona Water Commission, 621 P.2d 37 (Ariz. App. 1980) is not applicable. In that case, appropriators were faced with repeated applications for consumptive uses that would adversely affect their water rights and had no other remedies available. In this matter, the applications that these parties object to will not consume water and future diversions can be precluded by closing the basin. Mont. Code Ann. § 85-2-319.

of its water. Mont. Code Ann. § 85-2-101(3)(1991).

Postponing a decision on water reservation applications until the completion of the adjudication would not address the objectors concerns. Final decrees from the Water Court will establish water right priorities and an upper limit of historical use. Not all appropriators take water at the same time, not all use their water to the maximum extent of their right at all times, and return flows are available for downstream use. Physical water flow records are reliable evidence to show the patterns of use on a particular stream. The Water Court decrees will recognize and confirm the existing rights that reservants must respect.

Certain objectors also assert that the reservation statute gives priority to water reservations unfairly. The water reservation statute gives the reservant a July 1, 1985 priority date if the application for water reservation was submitted by July 1, 1989. Some objectors apparently are arguing that the priority date should be 1989. The statute clearly states the Legislature's intention that reservations have a July 1, 1985 priority date.

Water law in Montana has always provided for "relation back," that is, if the appropriator exercises reasonable diligence in completing his appropriation works and puts the water to beneficial use then the priority date of the water right will relate back to the date of commencement. Bailey v.

Tintinger, 45 Mont. 154, 171 (1911). Statutes later requir[redacted] filing in order for the priority date to relate back to the [redacted] of filing. Id. Otherwise the priority date would be the d[redacted] actual beneficial use. The Water Use Act now provides that [redacted] priority date will be the date of filing an application if [redacted] beneficial use is made within the time period established under the permit. Mont. Code Ann. § 85-2-302 (1991). Because the priority of appropriation is very valuable, as pointed out by objectors, it is important to protect the right against intervening users prior to perfecting the water right.

The Legislature established a July 1, 1985 priority date to act as an incentive for reservants to participate in one unified proceeding (instead of 39 separate proceedings). A water reservation application is also very detailed compared to a permit application. There appears good justification to allow the priority date to relate back to 1985 so that the applicants had time to prepare their applications as part of the unified proceeding.

There is no indication that any of the Objectors include water rights holders between 1985 and 1989. This motion lacks merit and movants have no standing to raise it.

The Board concludes that the hearing process did not violate any party's right to substantive due process.

1. Equal Protection

Certain objectors assert that the instream applications should be dismissed on equal protection ground. They argue that private appropriators may want to build storage in the future, but are prohibited from applying for a water reservation. (Brief in Support of Motion to Dismiss on Due Process Grounds, Upper Big Hole Objectors, p. 8.) Only State or Federal agencies or subdivisions of the State may apply for a water reservation. Mont. Code Ann. § 85-2-316(1)(1991).

The Fourteenth Amendment to the United States Constitution and Article II, Section 4 of the Montana Constitution of 1972 provide that no person shall be denied the equal protection of the laws. Legislation that does not involve suspect classifications or impinge on fundamental rights must be upheld against equal protection attack when the legislative means are rationally related to a legitimate governmental purpose. Intake Water Company v. Yellowstone River Compact Commission, 590 F. Supp. 293, 298, cert. denied, 459 U.S. 969 (1982). Such legislation carries with it a presumption of rationality that can only be overcome by a clear showing of arbitrariness and irrationality. Id.

Even assuming that objectors could make a showing that they have an interest in a future appropriation beyond a mere expectation and that the classes are similarly situated, the standard for review would be the "rational relation" test. Id.

The water reservation process does not involve suspect

classifications or impinge on fundamental rights. "A suspect class is one 'saddled with such disabilities, or subjected to such a history of purposeful unequal treatment, or relegated to such a position of political powerlessness as to command extraordinary protection from the majoritarian political process.'" Matter of C.H., 210 Mont. 184, 198 (1984)(quoting, San Antonio School District v. Rodriguez, 411 U.S. 1, 28 (1973)). Appropriators of water in Montana are not saddled with disabilities, have not suffered a history of purposeful unequal treatment, and are not in a position of political powerlessness; no suspect class is involved.

The nature of the individual interest affected by the water reservation statute (anticipation of applying for a future water appropriation) is not a fundamental right. Matter of C.H., at 198. Review of a statute for equal protection violations requires a inquiry into the nature of the interest affected, the extent of the affect, the rationality of the connection between the legislative purpose and the means used to carry out the purpose, and alternatives for effectuating the purpose. Id.

The interest affected in appropriating water is considered economic, and the right to pursue a particular "calling," such as agriculture, is not a fundamental right. Country Classic Dairies v. Milk Control Bureau, 847 F.2d 593, 596 (9th Cir. 1988). The extent of the affect of water reservations will also be economic by possibly limiting or precluding future water uses.

The water reservation bears a rational relationship to a

legitimate state purpose. The objectors seek dismissal of only the instream flow applications. Instream flow applications were filed by agencies statutorily vested with responsibilities regarding protection of fish, wildlife, recreation and public health. These are legitimate resource interests of the State. The water reservation statute was created, in part, to provide a means for recognizing and protecting these resource values. Other legislative alternatives to protect instream resource values through the appropriation of water, such as issuance of permits or sale of water rights would have the same impact on future appropriators.

Objectors have not met their heavy burden to show that the water reservation statute is not rationally related to a legitimate governmental purpose. The Board concludes that the hearing process did not violate any party's right to equal protection.

3. 50% Limitation on Gauged Streams

Intervenor Montana Council of Trout Unlimited and the Montana Chapter of American Fisheries Society (MTU/AFS) argue that the limiting instream water reservations to 50% of the average annual flow is unconstitutional and arbitrary. (MTU/AFS Brief, at 7-8). MTU/AFS asserts that the Montana Constitution guarantees a clean and health environment and the 50% limitation violates this constitutional provision. They also assert that no studies concerning its effects were done prior to passage of the

limitation and that it prevents DHES from carrying out its constitutional and statutory duties of protecting public health.

The Board appreciates the fact that the Hearing Examiner provided an analysis of the issues involving this constitutional challenge. The Board also is cognizant of why the Intervenor has raised this issue. This Board, however, does not have the power to declare statutes unconstitutional. The Board is required to follow the statutory dictates in reaching its decision on reservations. The law, Mont. Code Ann. § 85-2-316(6)(1991) set the 50% limitation and this Board may not disregard it.

4. Baker Ditch

Several objectors contend that recent language from the Montana Supreme Court prohibits any granting of instream flows except by the Water Court. (See, Brief in Support of Motion to Dismiss for Lack of Jurisdiction, Upper Big Hole Objectors, pp. 1-3.) Baker Ditch Co. v. District Court, ____ Mont. ____, 49 St. Rep. 17 (1992), considered instream flows that for practical purposes were given a priority date earlier than an existing, pre-1973 water right. No such instream flow is at issue here. To the extent that this opinion may be read as prohibiting the reservation process from continuing despite clear legislative direction, the Board considers that part of the decision only dicta.

5. The Applications are Timely

Some objectors assert that there is no legal basis upon which to grant a reservation because ARM 36.16.117 provides that the determination on reservation applications must be made before December 31, 1991. (Brief of Mill Creek and Wisconsin Creek Objectors, p. 4.)

The water reservation statute was amended in the 1989 legislature to change the date for the final administrative decision on the upper Missouri River basin water reservation applications from December 31, 1991 to July 1, 1992. (Chap. 134, 1989 Sess. Laws.) Notice of Proposed Rule Change was issued on July 15, 1991 to update the administrative rules governing the water reservations to reflect this statutory change. MAR, No. 14, July 25, 1991. The Board adopted the Proposed Rule Change on September 30, 1991 and ARM 36.16.117 was changed to July 1, 1992. MAR, No. 19, October 17, 1991. The Board continues to have authority to act on water reservations.

6. Transportation of Water Out of the State.

Objectors raise an argument that granting instream flows would leave water in the rivers that would eventually flow out of the state. Therefore, they argue that the applications are the instream flow applicants are "reserving water for transport outside of the State of Montana" and are subject to the more stringent requirements for granting a reservation for that purpose. (Brief of Mill creek and Wisconsin Creek Objectors, pp.

4-5.) Mont. Code Ann. § 85-2-316(4)(b)(1991).

The water reservations statute authorized public entities to apply for beneficial uses of water within the state. Out of state transport of water may also be reserved, however, the applicant must show by clear and convincing evidence that the criteria in ARM 36.16.107B(5) have been met. All instream flow applicants have applied for use of water on reaches and points located wholly within the State of Montana. The instream beneficial uses of water will occur entirely within the State. The fact that such use within the State incidentally benefits another state does not bring the application under the auspices of ARM 36.16.107B(5). Wise utilization of water within Montana is authorized by the legislature to include uses accomplished by leaving the water instream.

7. Adverse Affect

Numerous objectors, both full parties and limited parties, have objected to the instream flow applications on the basis that instream flow reservations would adversely affect their existing water rights. (E.g., Memorandum, Lower Big Hole Objectors (Gilbert), pp. 11-13.) Claims of adverse affect fall into four general categories. Instream flows would prevent the exercise of their water rights. Instream flows would prevent future changes in their water rights. Instream flow reservants would gain standing to object in the adjudication process. And finally, instream flow reservations would alter existing administration of

water rights by requiring appointment of water commissioners and installation of measuring devices.

Under the Prior Appropriation Doctrine, first in time is first in right. The first person to use water from a source establishes the first right, the second person is free to divert flows from what is left, and so on. During a dry year the person with the earliest priority date has the right to use water senior to that of subsequent appropriators. Since instream flow reservations have a July 1, 1985 priority date, they are subject to and cannot interfere with the exercise of a valid water right with a senior priority date. These senior water rights include the right to store water and all water rights attendant to such storage. All objectors herein claim a senior (usually very senior) water right and will not be adversely affected by granting instream flow reservations.

Objectors also imply that they would be adversely affected by adding an additional user to a "fully appropriated" stream. Legal water availability is not a criteria for granting a water reservation. Mont. Code Ann. § 85-2-316(4)(1991). However, senior water rights cannot be adversely affected. ARM 36.16.107B(7).

The water reservation statute specifically authorizes applications for instream flow water rights. Mont. Code Ann. § 85-2-316(1)(1991). Purposes served by instream flow reservations such as fish, wildlife, recreation, and water quality are recognized beneficial uses of water in Montana. ARM

36.16.102(3). The instream flow requests are for streams that have not been closed to new appropriations. Mont. Code Ann. § 85-2-319 (1991).

A prior appropriator cannot prevent subsequent appropriations if he can continue to reasonably exercise his water right. Mont. Code Ann. § 85-2-401(1)(1991). Instream flows do not require a diversion, impoundment, or withdrawal in order to prefect a water right. Instream flows will not consumptively use water, so prior existing rights will have no need to shut down a junior diversion by putting a "call" on the water in order to exercise their right.

An extension of Objectors' over-appropriation argument is that instream flow reservants cannot beneficially use water that is not there. Applicants have shown water is physically available for use. ARM 36.16.105(B)(2). Physical water availability is only used to demonstrate that a flow exists in the stream for beneficial use. Of course, the amount of flow will vary from year to year (and even from day to day) based on climatic changes and the uses of senior appropriators. Applicants have shown that historically, in most years, water is physically present in the amount requested for at least part of the year. For ungauged streams flows were estimated by the U.S. Geological Survey and evidence of fish populations were presented. There is substantial evidence that flows exist and instream flow reservants have a right to apply to use that water when senior water right holders are not using it. Cook v.

Hudson, 110 Mont. 263, 283 (1940).

Many objectors claim that instream flows would adversely affect their water rights by preventing future changes of those rights. The corollary of the Prior Appropriation principle of first in time is first in right, is that subsequent appropriators are entitled to maintenance of the condition of the stream existing at the time they make their appropriations. Quigley v. McIntosh, 110 Mont. 495, 505 (1940). Changes in use of a senior water right can only be made if others if subsequent appropriators are not thereby injured. Id. Cases dating as far back as the 1800s, show that subsequent appropriators can prevent changes to senior appropriations if their water rights would be adversely affected. Gassert v. Noyes, 18 Mont. 216, 223 (1896). This guiding principle is now contained in Mont. Code Ann. § 85-2-402(2)(a)(1991). For authorization to change an appropriation right, the appropriator must prove by substantial credible evidence that:

> The proposed use will not adversely affect the water rights of other persons or planned uses or development for which a permit has been issued or for which *water has been reserved*.

Mont. Code Ann. § 85-2-402(2)(a)(1991)(emphasis added).

The Montana Constitution recognizes and confirms existing rights. Mont. Const. Art. IX § 3(1). The basis measure and limit of an existing right is historic beneficial use. McDonald v. State, 220 Mont. 519, 530 (1986). The Water Use Act codified what has always been the law in Montana governing water rights. Neither the water reservation statute nor the change

authorization statute destroys the right to use water in the manner that it has been historically beneficially used. See, Castillo v. Kunneman, 197 Mont 190, 199 (1982). Senior appropriators have never been entitled to keep others from appropriating water as long as they could reasonably exercise their right, and senior water right holders have never been entitled to changes in their appropriation if subsequent appropriators were adversely affected. That new water right appropriators may restrict the ability to change water rights in the future is not and has never been an "adverse affect" recognized by law.

Objectors argue that granting a reservation would give instream reservants standing to object in the adjudication process. The water rights adjudication statute allows all water right holders and interested persons on a stream to receive notice of the temporary preliminary decree and preliminary decree and provides an opportunity to object, including water reservation holders. Mont. Code Ann. § 85-2-232(1)(1991). Junior appropriators have a material interest in having water rights accurately decreed. McDonald, 200 Mont. 519, 530. Granting reservations, and the rights that follow from that decision, is not "adverse affect" as recognized by law. It should be noted, however, that DFWP already claims standing and has participated in the adjudication process. Bd. Exh. No. 41, p. 47.

Finally, objectors point out that instream flow reservants

could change present administration of streams by requesting water commissioners and requiring measuring devices. Water commissioners are used to distribute water according to rights and priorities on streams governed by an enforceable decree. Mont. Code Ann. § 85-5-101(1) and (2)(1991); Bd. Exh. No. 41, p. 49 (describes limitations on appointment by instream flow reservants. Until such time as a stream is adjudicated, reservants do not have an independent method if seeking the appointment of water commissioners.).

"The appointment of a water commissioner to distribute the waters is a method devised to carry the decree into effect." State ex rel. Swanson v. District Court, 107 Mont. 203, 207 (1938). The expense of employing a water commissioner does not constitute an adverse affect recognized by law. McIntosh v. Graveley, 159, Mont. 72, 82 (1972). Similarly, instream flow reservants cannot require measuring devices. The District Court has discretion to require measuring devices if necessary to aid in the administration of water rights on a stream. Id., at 81-82.

8. Legal Water Availability

Many objectors contend that their earlier rights mean that water is not legally available on the stream and this forecloses the allowance of a reservation for consumptive uses or instream uses. (See, Brief, East Bench Irrig. Dist., pp. 14-15.) Water right claims are not accorded *prima facie* status in the water

reservation proceedings. (ORDER, Jan. 2, 1992.) However, evidence of existing uses was presented at the hearing and considered. This evidence consisted of decrees as well as claims.

One of the primary responsibilities in these proceedings is to determine whether or not the reservations would adversely impact existing rights. The criteria for reservations are distinct from those administered by the Department of Natural Resources and Conservation in the permitting process. Specifically, the permitting process requires an affirmative finding by the Department that there are waters available for appropriation in the source of supply. Mont. Code Ann. § 85-2-311(1)(a)(1991). This may be accomplished in certain cases by referring legal questions concerning existing claims to the Water Court. Mont. Code Ann. § 85-2-309(2)(1991). No such requirement or certification process exists in the legislation concerning water reservations. Mont. Code Ann. § 82-2-316(4)(1991); Mont. Code Ann. § 82-2-309(2)3)(1991).

The requirement for no adverse affect on existing rights is protected by the relative priorities of the existing rights and the reservation rights. In certain cases, particularly on the Teton River, water right holders have made a showing that their water rights would be affected due to water quality concerns. Water quality is an adverse impact that at the present is not adequately protected by priority date. For those reasons and in that situation it was found that the objectors rights would be

adversely affected by the reservation and the reservation was denied.

9. Conditions To Limit Objections To Change

Numerous objectors have suggested that instream flow reservations be conditioned to prevent reservants from objecting to changes of appropriation rights. The Board has the power to reasonably condition water reservations to prevent adverse affect of prior appropriators, and to aid in the administration, control, and regulation of reservations. However, this power does not extend to issuing reservations which cannot be protected or enforced. A water right holder may not make a change of appropriative right which will adversely affect a water reservation. Mont. Codes Ann. § 82-4-402(1991).

10. Need For Instream Flows

Many objectors assert that instream flows are presently fully protected by downstream hydropower rights. (E.g., Brief of Teton Users Association, pp. 2-6.)

The Bureau of Reclamation and the Montana Power Company have filed very large water right claims for water storage and hydropower generation in Montana. Bd. Exh. No. 40, pp. 57-59. Although water right claims are not *prima facie* evidence in this proceeding and the Board makes no determination concerning the nature or extent of the existing water rights, it can safely be said for arguments sake, that the Bureau of Reclamation and the

Montana Power Company have substantial water rights to Missouri River water. To the extent that these hydropower rights may be adjudicated as claimed, they may call for greater flows than the instream reservation requests. The issue presented by objectors is whether the instream flow reservations are needed if hydrogeneration protects the status quo of stream flows.

Instream water reservations would use the same water that is claimed by hydropower producers. These uses are concurrent. The purposes of water use by hydropower producers and instream flow reservants are different. Hydropower producers are not required to exercise their right for the benefit of other instream resource values, nor can they be compelled to continue to exercise their rights. Furthermore, changes or new developments, such as small scale hydropower, could have significant localized impact without adversely affecting hydropower rights. The water reservation applicants have demonstrated that there are water resource values that warrant reserving water for specific authorized purposes, the reservations are needed. ARM 36.16.107B(2)(b). Because, however, as a practical matter the water is the same, the Board determined to grant instream flow reservations concurrent with other non-consumptive rights.

The instream flow reservants can exercise all their rights associated with the reservation independently of the concurrent non-consumptive right holders. The water right adjudication will at some point establish the nature and extent of the hydropower and storage rights. If that determination results in those right

being less than claimed, the Board under its review authority, can modify the concurrent status of the instream flow reservations it has granted.

11. Water Quality

Water quality issues are beginning to gain attention. The past two decades have been a time of rapidly changing laws and standards in the water quality area. Montana faces the challenge of how to integrate water quality concerns with existing law and existing rights concerning water use and allocation. In future years additional information will be gathered, laws refined, and hopefully innovative approaches developed to deal with this integration. Many Conservation Districts projects have been granted a water reservation conditioned on meeting water quality laws at the time of development. The public interest criteria allows this process to move forward, while addressing the water quality issue at the time of development. This does not make the Conservation District reservation speculative; but demonstrates the need for flexibility as conditions change.

CONCLUSION

There has been much discussion about the affect of granting reservations on senior water right holders. As set forth previously, the legal doctrine of prior appropriation developed to include the acceptance of junior water right holders. Junior

water right holders are entitled to the maintenance of stream conditions at the time of their appropriation. Statute now incorporates this principle. Reservations for instream use cannot be denied solely because they with have an impact on senior water rights.

The Board firmly believes that the granting of instream reservations will have an impact on senior water right holders and are indirect costs of the reservations. It is naive to think that granting an interest in a scarce resource when there are already competing interests won't have an impact. The fact is that junior water right holders, whether reservations or some other type, do have an impact on senior water right holders. This impact varies with the particularities of individual situations. To deny the impact in general is to ignore real life experiences.

The concerns of the objectors are real. The Legislature has chosen to incorporate the reservation process into the existing system of water rights and the adjudication of those rights. The Board recognized the Legislature's prerogative in doing this. The Board accepts that the Legislature is presumed to have considered in full all the possible ramifications of its decision. In authorizing the process for reservations on the Missouri River basin, the Legislature has by implication weighed the concerns of the objectors. In carrying out its responsibilities to conduct the reservation process, the Board can only deal with the facts as presented within the guidelines

of the law.

Based on the facts before it, the Board finds the concerns of the objectors are valid. The Board cannot change the law it has recited. It can only work within that system. In reaching its decision on granting the reservations, the Board has used the law as it exist today to address the objectors' concerns.

The objectors are not powerless in the face of the reservations the Board has granted. If there is no water available as the objectors argue, they have the power to deal with the instream flow reservations. If water is available, the reservations stand to fulfill the purposes the Legislature intended.

The above Findings of Fact, Conclusions of Law, Order, and Memorandum were adopted by the Board of Natural Resources and Conservation and the reservations granted herein became effective on June 29, 1992.

DATED this 30 day of June, 1992.

Jack Galt

Jack Galt, Chairman
Board of Natural Resources and
Conservation